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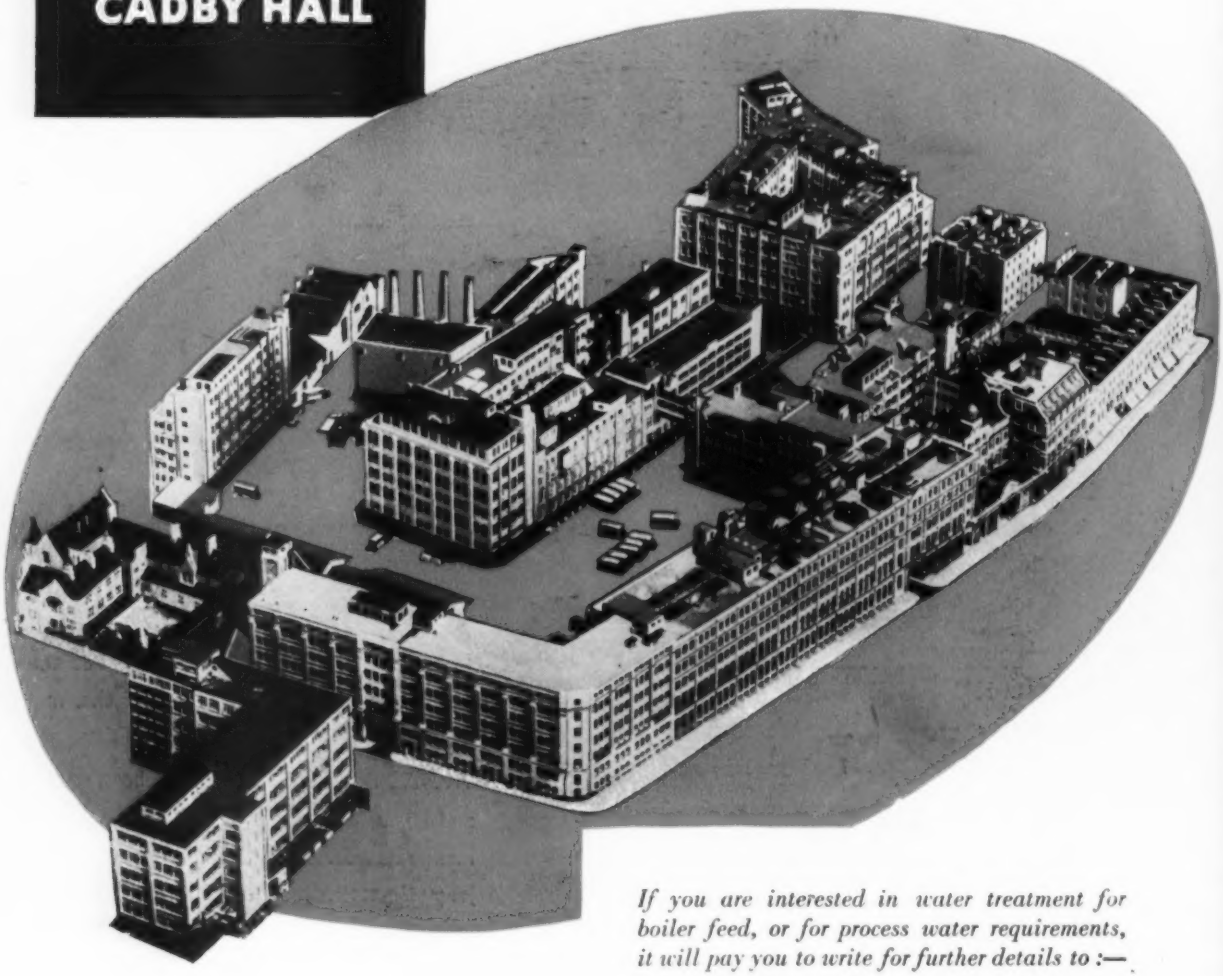

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FOOD MANUFACTURE

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FOOD MANUFACTURE

Vol. XXVIII, No. 11 November 1, 1953

The 1953 Cocoa Conference

ONE of the most important points raised at the recent Cocoa Conference was concerned with quality—how to assess it and the reasons for the development of a good chocolate flavour in the bean. Both plant breeders and those responsible for the rehabilitation of old cocoa areas and for the development of new ones have expressed the view that there is a need for speed and for precision in specifying the quality required. There are, however, many difficulties, chief among which is the assessment of the quality of small samples, where processing and manufacturing, as well as genetic differences, introduce many variable factors.

One of the main disadvantages of the present very high prices, which reflect a demand greater than the existing supply, is that the market absorbs bad and indifferent cocoa at a price little below that paid for good cocoa. Nevertheless, it is strongly emphasised that not only should quality be maintained, but also that there should be improvements in harvesting, fermentation, drying, and storage.

In view of the magnitude of losses resulting from disease—stated to be 200,000 tons a year—various aspects of its control were discussed. Swollen shoot disease is rightly regarded as the major enemy of cocoa in West Africa, and there is little doubt that if it is not controlled, it must eliminate cocoa cultivation in that region. Hopes that systemic insecticides would prove useful in combating swollen shoot have not as yet been realised, such progress as has been made being entirely the result of cutting out the diseased trees.

The urgency and nature of this problem have tended to distract attention from other causes of disease, such as capsid bugs, which attack the trees and the crop, and black pod, which is responsible for the loss of a large part of the crop after it has actually been set on the trees.

The control of pests and diseases is by no means the only problem to be confronted. The cultivation of cocoa is still largely a peasant industry, and if the benefits of scientific discovery are to be fully developed, some modifications in the present pattern of cultivation are essential. In this respect further study and experiment should be undertaken on co-operative efforts in line and spaced planting.

Food Hygiene in Scotland

IT is understood that standards of hygienic handling of food products, giving public health officers the powers they have so far lacked, are to be introduced in Scotland at an early date. Since it involves acceptance of standard clean food methods, the new legislation will not affect the huge majority of legitimate food traders in any way, but only the small proportion of manufacturers and distributors who have so far taken advantage of the lack of controls.

For some years, Scottish public health and sanitary authorities have been pressing for powers to take action in cases of obviously unclean handling or preparation; while much could be done by precept, exhortation, and example, no legal action could be taken to enforce the desired end, until such time as complaints or illness resulted and action thereby made possible under the Food and Drugs Act.

The new proposals will cover all phases of food preparation, manufacture, handling, and sale, and will effectively correct a position which has prevented the progressive trader from reaping the benefit of his interest in hygiene.

Science and Dried Fruits

SOME of the older food processes have escaped to some extent the attention of scientists and have therefore remained empirical. Fruit drying is one of these processes, detailed research upon which is comparatively recent. Progress, or at any rate the opportunities for progress, in the dried fruits industry has been excellently surveyed by P. H. Richert, a Californian chemist (*J. of Agric. and Food Chem.*, 1953, **1**, 9, 610-612).

The principal changes that occur during drying and storage are chemical; it is only when poor fruits are selected or when drying conditions are inefficient that bacterial action occurs. Nevertheless, all too little is yet known about the various enzyme-activated chemical reactions that cause deterioration of colour, texture, or flavour during drying or in subsequent storage and packing. What is so far ascertained will not please the opponents of chemical additives, for in general it requires one or another additive of this kind to arrest these changes.

Sulphur dioxide, now widely used, retards both oxidising and enzyme-activated darkening changes,

but it is not accepted for use in all dried fruit products. Drying of some fruits is taken to a point at which texture is too tough for direct consumption, *e.g.* prunes and figs. These fruits, however, can be dried with a higher final moisture content (up to 30 per cent. or more) without risk of mould growth or fermentation and with a greatly improved texture if ethylene or propylene oxide is added when packing. These additives act as sterilising agents and their presence in the dried fruit is only temporary.

Gentler drying conditions that will improve quality and increase acceptability are only possible if suitable anti-enzyme agents can be developed. More remains to be done than has so far been achieved in this direction but, as Richert concludes, the past 25 years have brought more scientific progress than all the centuries before. Technology is beginning to displace tradition in the dried fruits industry.

Fluorination of Water

A PAPER by Charles Dillon, D.D.S., L.D.S., published in *The Dental Practitioner*, **3**, 12, 366, has for its object the demonstration of the toxic effects of fluorine on the vital tissues of the dental pulp and associated osseus tissues, and the long term effects of imbibing water containing toxic amounts of fluorine, from which the author concludes that the main tenets of the advocates of fluorination are unsound.

These investigations are a continuation of Mr. Dillon's earlier work recorded in FOOD MANUFACTURE, **28**, 2, 44.

The author supports his contentions by describing tests, which included the examination of the teeth of patients, to compare the fluorine content of sound dentine of teeth from individuals who had been exposed to different levels of fluorine intake.

From an obviously painstaking study, he concludes that they are wrong who set the limit of a daily intake of 4 mg. and that this is a very large dose for an element such as fluorine, which is both toxic and cumulative. Even this large dose is being exceeded every day by people living under "normal" conditions of modern life. We are surrounded by fluorine, he says; we get it from the dust of cities, from the widespread transportation of cements, fertilisers, and materials for road making, even from the dust of the most remote country village. We get far too much from foods and drink and much of it is unsuspected. The spraying of vegetables and plants with fluorine is to be condemned and more care could be taken to exclude this element in the manufacture of foods, but this will be rendered even more difficult, and indeed beyond the manufacturer's control, if in his food preparation he is obliged to use fluorinated water.

A sidelight on the question is given by Mr. Dillon as a result of some analyses of fluorine in tea which contains anything between 78 to 136 p.p.m. extractable fluorine.

Calculated on a consumption of six cups of tea per day per person, the population of South Shields has been consuming fluorine at the rate of 1·5 p.p.m. to 2·1 p.p.m. from tea and water together (0·82 p.p.m. from the water), and the people of West Hartlepool at the rate of 3·4 to 4·0 p.p.m. (2·6 p.p.m. from the water).

"Must it then be deduced from this that there is some particular quality in the fluorine with which it is intended to treat the water supply?" he asks. "Ironically enough, this is exactly true, for if it is intended to add sodium fluoride or sodium silicofluoride to the water supply, and if the resultant fluorine has the ability to reduce juvenile dental caries due to the enzyme inhibiting property of all soluble fluorides, or if it is selectively absorbed from the intestines, it will also have a toxic effect on the vital tissues of the pulp and its supporting structures, resulting in an early mass loss of teeth owing to periodontal disease. Nor will the process of tissue poisoning cease when all the teeth are lost."

Bread Additives

THE atmosphere of apprehension that has hung over chemical additives in food since the indictment of agene would seem to have damaged the prospects of the so-called emulsifiers for bread. In a recent article (*Endeavour*, 1953, **12**, 45), Prof. A. C. Frazer, though taking a generally cautious view about chemicals in food, stated that the available evidence indicates that glyceryl monostearate, stearyl tartrate, and polyoxyethylene stearate "should not be harmful to health if used in the quantities proposed." Dosage levels at 100 times the rate of consumption *via* bread have shown no toxic effects with rats; these substances have also been tested with several other species, including man, and no differences in reaction were found.

In America, Dr. G. F. Dasher (*Science*, 1952, **116**, 660) showed that at least as much of the mono- and di-glycerides would be formed in the cooking and digestion of fats normally consumed as would be put into bread *via* the additives; this confirms the opinion that they can be regarded as natural supplements rather than as chemical improvers.

The U.S. Food and Drug Administration originally decided that the mono- and di-glyceride additives were safe to use, but this legal blessing was held up because manufacturers of polyoxyethylene bread softeners objected to the court order that banned this single class. The FDA view was that polyoxyethylene products tended to deceive the customer by producing a fresh-baked softness of texture and that in any case their safety as additives had not been adequately tested.

It is a view quite recently confirmed by the National Research Council of America, who were asked by FDA to evaluate evidence on the specific softener, polyoxyethylene stearate. While there is

no evidence that this substance is harmful when fed in normal amounts, it is nevertheless held that its harmlessness is not established. Meanwhile the postponement of the U.S. bread standard order, which permitted the use of mono- and di-glycerides, has come to an end. These may be used, but polyoxyethylene softening agents may not.

Cathode Ray Pasteurisation of Egg

THE danger of infection from dried egg powders, which may frequently contain viable bacteria of the *Salmonella* group, has caused increasing concern in America.

Previous reports relating to this subject have shown that *Salmonella* strains multiplied rapidly in reconstituted eggs held at temperatures from 77° to 113°F., and it was concluded that these organisms might reach levels considered hazardous from a health standpoint if the reconstituted eggs were held at room temperature for a period of more than four hours. It was also found that *Salmonella* were able to survive temperatures at which lightly scrambled eggs are prepared.

Hence, even though the level of contamination may be low initially, short holding periods can cause the level of infection rapidly to assume dangerous proportions. This is significant in view of the fact that many foods containing eggs receive only light cooking, which is insufficient to kill the *Salmonella*, and that these foods are fed frequently to children, who are particularly susceptible to Salmonellosis.

Since the latter part of 1944, when the U.S. Quartermaster Corps stipulated pasteurisation in their specifications for the preparation of dried whole eggs, most American manufacturers have included a preheating treatment at 140°F. just prior to spray drying. Because egg proteins are highly heat sensitive, minimum pasteurisation times are used, and there is some question whether all *Salmonella* organisms can be destroyed by such treatment, especially at high levels of contamination.

Previous research in the Department of Food Technology, Massachusetts Institute of Technology, has indicated that cathode rays produced by a Van de Graaff electrostatic generator can be used effectively for the pasteurisation and sterilisation of numerous food products. Accordingly, exploratory experiments were planned by B. E. Proctor, R. P. Joslin, J. T. R. Nickerson, and E E. Lockhart, of the Food Technology Department (*Food Technology*, **7**, 7, 291) to determine the feasibility of substituting a cathode ray irradiating procedure for the current thermal pasteurisation of liquid whole egg prior to spray drying.

As cathode ray irradiation is essentially a cold sterilisation, thermal denaturation is not a problem, but cathode ray irradiation sometimes causes off-flavours. The development of irradiation flavour is dependent both on the nature of the substrate and the intensity of the cathode ray irradiation. Therefore, the feasibility of this procedure of eliminating *Salmonella* depends on whether the flavour development, at the level of irradiation necessary for sterility, is sufficient to be objectionable to consumers from a taste standpoint.

It had been noted in previous experiments on cathode ray irradiated foods that the off-flavours sometimes disappeared on standing and that elimination of unpleasant flavours was aided by conditions favouring aeration. It was felt that the aeration and vaporisation occurring during the spray drying operation represented a condition that would be highly favourable to the loss of such flavours, if such were developed at the necessary levels of irradiation. This in fact was demonstrated by a further experiment when the irradiation level necessary for *Salmonella* destruction caused an off-flavour, detectable in scrambled eggs prepared from irradiated egg magma. When this was spray dried, subsequently rehydrated, and offered to a taste panel as a scrambled egg dish, there was no significant preference for either irradiated or non-irradiated eggs.

Antibiotics in Custard Fillings

THE further studies on the preservation of custard fillings with subtilin and combinations of subtilin and terramycin carried out by W. J. Godkin and W. H. Cathcart, of the National Bakery Division of the Great Atlantic and Pacific Tea Company, New York, are reported in a recent paper (*Food Technology*, **7**, 7, 282).

Subtilin has previously been reported as showing much promise in controlling the growth of experimentally added food poisoning micrococci and those heat resistant non-pathogenic bacteria which occur naturally in the prepared custard fillings. This preservative effect was greater when a small amount of terramycin was combined with the subtilin. Since these investigations dealt only with strains of one type of food poisoning organism, *i.e. Micrococcus pyogenes* var. *aureus*, additional studies were undertaken to determine what effect subtilin and combinations of subtilin and terramycin would have in preventing the growth of food poisoning strains of *Salmonella* and enterococci in custard fillings. Members of the *Salmonella* often have been implicated with cream fillings in food infection outbreaks and, to a lesser extent, certain strains of the enterococci have been cited as causing gastro-enteritis.

Preliminary sensitivity tests showed that terramycin had the widest spectrum for antibacterial action against those strains of food poisoning micrococci, salmonellae, and enterococci available for experiment. Subtilin was used because previous work had demonstrated its effectiveness against the natural heat-resistant food spoilage organisms that occur in a normally prepared custard filling.

The incubation of custard fillings at 98·6°F. was favourable to the growth of the food poisoning bacteria used in this work and also to the normal heat-resistant flora. Consequently it is believed that under storage at average room temperature, the complementary antibiotic activity of subtilin and terramycin would be enhanced. The authors express the view that the addition of 100 p.p.m. of 70 per cent. potency subtilin and 10 p.p.m. of terramycin to a custard filling will retard the growth of food poisoning strains of enterococci, salmonelleae, micrococci, and also the normal heat-resistant spoilage organisms for a period of three days at summer temperatures.

When aerobic bacterial spores and food poisoning bacteria were added to custard fillings containing subtilin and terramycin, the rate of spoilage was hastened, but the growth of pathogenic bacteria was retarded for three days or longer. It is believed that the increased rate of spoilage was caused by the utilisation of the subtilin by the heat-resistant flora and the remaining antibiotic activity against the pathogenic organisms by the terramycin.

Food Supplements

EXPERIMENTAL work carried out recently suggests that possibilities exist for the use of *B. coli* cultures as food supplements.

The investigations have been concerned solely with the effect of the addition of *B. coli* to basal diets, and no attempt has yet been made to ascertain the biochemical background of the results of the experiments described in a letter from L. P. Roberts of the Evans Biological Institute, Runcorn (*Nature*, **172**, 4373, 351).

The material used consisted of heat-killed whole organisms, without removal of endotoxin. The strain was one selected at random from a collection of calf scour strains. The culture medium was a simple synthetic one, with nitrogen being supplied by ammonia and carbon by glucose. Batches of 100 litres of this culture yielded about 400 g. of bacterial protein, calculated as $N \times 6{\cdot}25$.

Judging from the results of feeding experiments with rats, it would appear that the *B. coli* protein could serve as a substitute for animal protein.

Further experiments on chicks suggest that cereals can be made into a rearing ration by the addition of *B. coli*, fish solubles, cod liver oil, and grass meal. The economic advantages of such a diet in Britain would be outstanding. The addition of cod liver oil involves no change from current practice, and the grass meal and fish solubles are abundantly available in relation to the small amounts needed. Further, the fact that the peculiarly exacting demands of the chick can be met warrants the prophecy that diets based on *B. coli* protein for other farm animals could be evolved with little difficulty.

Inside Information

JUST a hundred years ago, a book that ran into no less than five editions was published by Chapman and Hall. Written anonymously and edited by "A Minister of the Interior," the "Memoirs of a Stomach, Written by Himself that All who eat may Read," describes the various stages in the career of this particular stomach.

That its humour is still topical may be gathered by the fact that it was used as a theme in exactly the same way not so long ago by a well-known columnist in one of the Sunday papers.

Descended from the great Sir Hugh Stomach, created baron from the huge quantities of beef he was able to digest, the hero of this 1853 autobiography derives the family name Stomach from "Sto," to stow away, and "ach" or hack, meaning to hew into small pieces. No one has a right, we are informed, to enquire by what manual agency a stomach can write such a work. It is pointed out that "my helpmate, Mr. Brain," who "lives in the attics while I reside in the drawing-room floor," has no business to look down on one who exceeds him in separating the good from the bad and digests all matters received.

In this mock philosophical manner the career of Mr. Stomach is told. There are details of regular disciplined meals while at school to compensate for an occasional blow from schoolboys during a fight; of the first reactions to a live oyster, "a mucilaginous mass" suddenly sent down. Later there are oysters enjoyed since Mr. Appetite is improved by gastric acid secreted by such an appetiser, together with a dissertation on the oyster itself, a creature which "reverses the usual way of expiring, for it lives in its bed and very often dies out of it." There are reminiscences of the sickness caused by the schoolboy's first smoke and on to a college career, with devilled kidneys, pigeon pie, mushrooms, caviare, and *pâté de foie gras*, leading to dyspepsia and doctors' potions, and later to visits to expensive clubs and restaurants.

Added to these are outcries from the gourmet, such as: "Oh, that my stomach were a cable long and every inch a palate!" The shooting begins with the grouse at table, not unfamiliar today, when, after some excellent meals in Paris restaurants, the author returns to England. "Sodden dumplings, carrots red with disgust, and turnips pale with dismay" is one such jeremiad. There is nothing new under the sun.

TO AUTHORS

The publishers of FOOD MANUFACTURE and the other journals of the Leonard Hill Technical Group are prepared to consider the publication of articles and text-books on their various subjects.

The Dressing, Curing, and Smoking of Salmon

Elliot B. Dewberry, M.B.E., F.R.San.I., F.R.I.P.H. & H.

From time immemorial salt curing, drying, and smoking have been the usual methods for temporarily preserving and keeping fish palatable for consumption. Today smoke curing is utilised not only as a means of preservation but also of imparting to the fish an attractive flavour and colour. In recent years smoked salmon has become a favourite article of food and is considered a delicacy, the demand for which is increasing both in this country and abroad. Apart from its attractiveness, the flesh of the salmon is highly nutritive, having a high fat content, and containing useful amounts of calcium, phosphorus, and iodine, and vitamins A and D.

SALMON for curing is packed in ice for transport from the fisheries in the United Kingdom to the curers' premises. To obtain a first class smoke-cured product it is essential that the fish be received in a fresh condition.

The minimum weight of a salmon for smoke curing should be about 12 lb.; smaller fish are unsatisfactory as they have insufficient fat content and consequently produce thin fillets, or sides.

There are several methods for curing salmon but in the U.K. a mild cure is usually preferred.

The salmon catch. *Photo The National Film Board, Canada.*

Preparation of the Fish

The fish when unpacked are handled in such a way as to avoid bruising or tearing. After a preliminary washing, the head and fins are removed. The body is split from belly to vent, gutted, cleaned, trimmed, and the backbone removed. The cavity is then washed in running water to remove all traces of blood, guts, gills, and membranes, as these decompose more rapidly than the flesh and their prompt and complete removal conduce to the better final quality of the product. The fish is then cut into sides and the skin of each lightly scored with a knife to facilitate more thorough salting, which is the next operation.

Method of Salting

The salmon is packed in coarse fishery salt for a period of 16 to 48 hours, according to size. In addition to penetrating the flesh, salt extracts water from the tissues, forming a strong saturated brine. After removal from the salt, the sides are thoroughly washed and hung up to dry. The drying operation may be carried out either in the open air or in a drying room, the choice of method depending on the temperature, and humidity of the air. During drying, the fish lose about 10 per cent. of their fresh weight.

Smoking Process

The dried fish are then loaded into the cold smoke kiln. In the traditional kiln, the sides are hung on wooden sticks (tenters) on hooks, or threaded through the lugs on to pointed metal rods (speats). Large whole fish are suspended by the tail and kept flat open by pointed sticks or skewers.

In the modern kiln the speats are placed on ledges arranged on a trolley which is wheeled into the kiln. Hot air and smoke from smouldering oak or birch sawdust (some curers use a proportion of juniper wood) are passed over the fish at a temperature of not more than 85°F. from 24 to 36 hours. During this period the fish may lose a further 10 to 20 per cent. of water. If stored in a chill room maintained at a temperature of about 36°F., the finished product will remain in first class condition for about 10 days.

Smoke-cured salmon sides

AVERAGE COMPOSITION AND FOOD VALUE OF SALMON COMPARED WITH SOME OTHER FOODS

Food Material	*Total Solids*	*Fat*	*Protein (N×6·25)*	*Ash*	*Carbo-hydrates*	*Calories per lb.*
Salmon	36·4	13·4	21·6	1·4	—	965
Beef, round ..	33·3	9·0	23·0	1·3	—	805
Hen's eggs ..	26·9	11·7	13·7	1·0	0·5	760
Potatoes	24·5	0·2	2·0	1·0	21·3	440
Cow's milk ..	12·6	3·7	3·4	0·7	4·8	310
Cabbage	10·0	0·2	1·9	1·2	6·2	170

The salmon in cure.

should be firm, and free from smuts and dirt; the cut surface should be bright and glossy. By virtue of its smoky flavour, and solid consistency produced by drying, the product is a characteristically palatable one which is often preferred to the fresh fish.

Smoked salmon is packed in greaseproof paper and placed between boards to prevent damage, or packed in boxes each containing about 30 lb. of the fish.

Scotch Mild Cured and Smoked Salmon

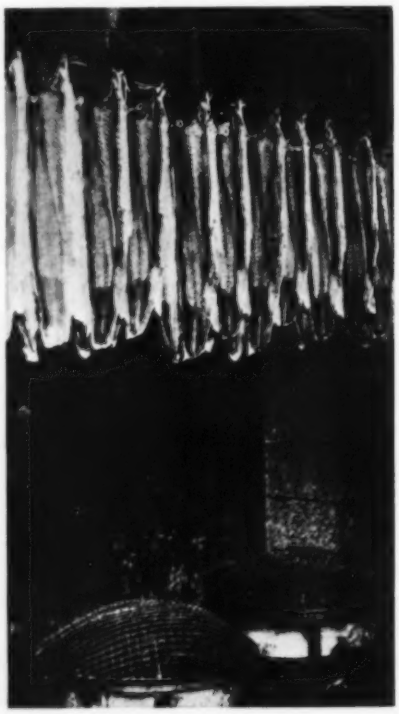
In Scotland, salmon to be mild cured or smoked is first washed and the head removed. It is then split down the back for the removal of the roe and entrails and thoroughly washed. The fish is afterwards placed skin downwards on a table and well rubbed with a mixture of equal quantities of coarse fishery salt, brown sugar, and in some cases a small quantity of saltpetre.

After about 48 hours the salmon is removed and hung up to dry, either in the open air or in an ordinary kipper or finnan kiln by means of three small double-pointed sticks passed through the skin at intervals along the back of the fish to keep it spread out during the drying process. It is then placed in the smoke kiln for a few hours. This process can be regarded only as a temporary mild cure; because of its high fat content salmon so treated will keep in good condition only for about the same time as kippered herrings or finnan haddock.

The Norwegian Mild Cure

In the Norwegian method the head is removed and the salmon split down the back. Roe and intestines are removed and the fish thoroughly washed to free it from blood and debris. It is then placed in salt pickle for three days and afterwards washed in running water and drained. The cleansed fish is stretched upon pieces of thin lath, sharpened at both ends (spits) about 1½ in. in breadth and cut to a length corresponding to the breadth of the fish. One of the spits is placed across the back of the fish at the lugs, or shoulders, and another about half-way down. If the fish is a large one, a third spit is fixed further down the back, the points of the spits being passed through the skin. The salmon is then "tentered," hung up in a chimney and exposed to smoke from a fire of fir branches for one and a half to two days.

Salmon smoked by this process is similar in appearance to Aberdeen cured haddock except that the colour is a little darker.



Salmon sides in the smoke house.

Norwegian Hard Cure

The salmon is washed in clean water, head and fins removed, belly split open, and roe and intestines taken out. It is split into sides (to facilitate curing and packing in the barrels) and washed thoroughly to remove all traces of blood, etc. The sides are then laid skin side downwards on a table, and a mixture of equal parts of fishery salt and brown sugar is gently but firmly rubbed into the flesh. Some of the mixture is placed in the bottom of a barrel or cask and the sides of salmon carefully packed in it—layer upon layer—with a quantity of the salt mixture between each layer. Hard packing should be avoided so as to allow the pickle to circulate freely. It is then filled to the top with a fresh saturated solution of fishery salt. The end is put in and "tighted," and the barrel laid on its bilge.

The barrel should be opened occasionally for the contents to be examined. If found to have become stale, fresh pickle should be substituted, the sides of salmon removed, well washed in clean pickle and repacked. It is of the utmost importance that during the weeks allowed for "pining" and also after repacking to see that the barrel is kept full of pickle. Salmon treated in this way should keep two or three months. To avoid taking any risk, some curers re-

Salmon dried in smoke oven and ready for the fire.

move the sides from the barrel after two or three weeks, wash and repack them in fresh pickle.

When the salmon sides are required for smoking, they are taken out of the barrel, thoroughly washed in clean water, drained, dried, and afterwards smoked in the same manner as for the milder cured fish.

For the purposes of transport the smoked sides are wrapped separately in greaseproof paper and packed in wooden boxes, each holding about 30 lb.

Smoke Curing in the U.S.A.

The salmon is washed thoroughly in running water and the skin lightly scored longitudinally with a knife, at intervals of about 2 in., so as to penetrate the skin but not the flesh. It is then split into sides and cleansed of all viscera and other offal. Care is taken in handling the newly split sides as they are easily broken or bruised. Any blood remaining in the veins around the belly cavity is gently pressed out from the flesh. If this is not done the salt will harden it during the process of curing and the flesh will become dark in colour. The sides are washed and left to soak in ice-cold water for half an hour and then drained and trimmed.

A mixture is made as follows:

Fishery salt	6 lb.
Brown sugar ..	4 lb.
Saltpetre	1 oz.
Bay leaves	½ oz.
Black peppers ..	½ oz.
Cloves	½ oz.
Coriander seeds ..	½ oz.
Allspice	½ oz.

The spices are ground or crushed and mixed well with the other ingredients.

The sides of salmon are placed skin side downwards on a table and some of the mixture firmly rubbed into the flesh. They are then packed, layer upon layer, in a barrel or tub with a quantity of the mixture between each layer, where they remain for 48 hours. The sides are removed, scrubbed, and soaked in fresh cold water for one hour, the excess moisture being pressed out of the flesh by means of heavy weights.

After some hours they are suspended on smoke sticks in the open air to dry until a thin skin or pellicle forms on the surface. If the weather is unsuitable they are transferred to a drying room where a fan or blower is used. When sufficiently dry the sides are hung up in the smokehouse over a low fire of beech or other hard white wood chips from 16 to 24 hours. Finally a dense smoke is built up to which the fish is subjected for an additional eight hours. The temperature in the smokehouse at any time should not exceed 80°F.

Salmon sides which have received the above treatment remain in good condition from 10 to 14 days at room temperature.

The photographs on pages 426 and 427 are published by courtesy of L. A. Britton and Sons.

Electric Resistance Heating

THE fifth in the series of books dealing with electricity and productivity has now been published.* Confined to the use of electricity for resistance heating, the book conveys an excellent idea of the wide nature of the subject.

Starting with the theory of electric resistance heating and the types of element that may be used, the book goes on to give examples of electric heating equipment of every type, from large heat treatment furnaces to electric soldering irons.

In 13 chapters the following aspects of the subject are discussed and fully illustrated: advantages of electric heating, fundamentals of heat, thermal insulation, electric heating elements, temperature control, electric resistance furnaces, electric salt baths, electric ovens and infra-red heating, soft metal melting, liquid heating, platen, press, and roll heating, electric steam boilers and steam raising, and miscellaneous applications.

The case for electric heating is that where it is used in industry it helps to increase production either directly or indirectly. This book contains matter which cannot fail to interest the members of every branch of industry.

* *Electric Resistance Heating.* Pp. 181 + xvi. British Electrical Development Association. Price 9s.

Metallic Contamination of Lollies

SINCE the publication of the report of Dr. Semple, Liverpool Medical Officer of Health, on the subject of metallic contamination of ice lollies (see also FOOD MANUFACTURE, **28**, 9, 340) steps have been taken to see what can be done to minimise this hazard, notably by the Ice Cream Alliance, who held a meeting on September 17 to discuss the whole question.

It was the general opinion that although Dr. Semple's findings were based on a relatively small number of samples, and the local water supply was not entirely above suspicion, there appeared to be adequate grounds for assuming that some of the lollies in question had been contaminated with lead and other metals during the processes of manufacture.

Dr. Semple had come to the conclusion that the moulds used in freezing were responsible for the contamination, but he had omitted to mention the vessels in which the lollie mixtures were prepared and stored prior to freezing; having regard to the greater length of time during which the liquid mixtures remained in these vessels compared with the moulds, the possibility of metal corrosion was greatly increased.

Although a number of metals featured in Dr. Semple's report, the meeting concentrated on methods of minimising the risk of lead contamination and it was generally agreed that it was of the utmost importance that the acid lollie mixtures should not come into contact with that metal at any stage of processing.

Bearing in mind that large numbers of tinned copper and tinned steel moulds were in use in the industry, it was pointed out that the expression "tinning" had no precise definition and could mean coating with refined tin or a mixture containing a large proportion of tin. It was felt that many ice lollie manufacturers may be having their moulds re-tinned locally with tin lead tinning which was a potential cause of contamination.

The questions of mould construction, re-tinning, cleaning, the use of detergents, freezing time, and the use of stabilisers, were discussed at great length by those present, among whom were Mr. Morley T. Parry of the Ministry of Food, representatives of the Sanitary Inspectors Association, Tin Research Council, and equipment manufacturers, and members of the Alliance. The following recommendations were generally agreed by those present:

1. When buying tinned copper or tinned steel moulds, or having existing moulds re-tinned, the trader should insist on a warranty that the tinning has been carried out in a pit to which only refined tin, and no lead, has been added.

2. It is preferable to use moulds without soldered joints, but when such moulds are purchased or re-tinned (which involves re-soldering the joints) a similar warranty should be obtained to the effect that only refined tin solder has been used.

3. Moulds should be inspected at frequent intervals and sent away for re-tinning as soon as the basic metal becomes exposed.

4. Leaking moulds should be repaired only with refined tin solder, which involves the use of the correct flux. Iced lollie manufacturers are strongly advised against the practice of repairing small leaks and pin holes with plumbers' solder.

5. Moulds of aluminium, stainless steel, plastic, and rubber construction cannot give rise to lead contamination, but would-be purchasers of such equipment should give serious consideration to economic factors, durability, resistance to acid and brine, comparative freezing time, and the texture of the finished product.

6. There is definite evidence to show that a thin liquid film of lollie mixture on mould surfaces will lead to even greater metal corrosion than when the mould is full. It is recommended that moulds should be washed with clean water between batches, as this will remove the film of lollie mixture and at the same time greatly reduce the work to be done by detergents.

7. When detergents are used, only preparations specified for tinned surfaces should be employed. Most of the leading manufacturers market these preparations, and their instructions for use should be closely followed.

8. The construction of vessels used for mixing and storing lollie liquids prior to freezing should be free from lead in any form. Galvanised containers should also be avoided as these may lead to zinc contamination of the finished product. Where vessels have tinned copper or tinned steel surfaces, or soldered joints, traders should ask for similar warranties as in the case of moulds. A number of other materials such as stainless steel, glazed earthenware, and enamel may be suitable for storage containers, but traders should ascertain from the manufacturers that the grade of material used is suitable for the purpose intended. Glazed earthenware and enamel should be free from lead and antimony respectively.

9. The rate of freezing is an important factor in the reduction of lead contamination. Corrosion of metal surfaces will occur only while the lollie mixture remains in liquid form. As soon as the mixture in immediate contact with the mould surfaces becomes frozen, corrosion stops. It is therefore apparent that the effective life of tinned surfaces will be extended if rapid freezing is carried out.

10. Investigations by the Tin Research Council have shown that the incorporation of a stabiliser in a lollie mixture has the effect of reducing the corrosion of metal surfaces. The majority of ice lollie manufacturers who use stabilisers do so because they improve the texture of the finished product, but it should be borne in mind that their use will assist considerably in reducing the amount of metal pick-up, and thus prolong the effective life of tinned surfaces.

FUTURE ARTICLES

AMONG the articles to be published in forthcoming issues of FOOD MANUFACTURE are the following: "Processing Vegetables in the U.S.A.," Part II, "American Flavours for Soft Drinks," "Recent Advances in Protein Nutrition," and "The Manufacture of Cucumber Products in Sweden."

Glyceryl Monostearate in the Baking Industry

B. E. Harper
Advita, Ltd.

Glyceryl monostearate, more familiarly known as G.M.S., was first developed as an emulsifying agent and was readily recognised as an invaluable ingredient for this purpose in ice cream, synthetic cream, and for other purposes where an efficient oil-in-water emulsifying agent was required. When fat was scarce, many manufacturers, including bakers, sought ingredients to extend their fat allocations and some used G.M.S. for this purpose. While traders equipped with adequate testing facilities were able to use it to the best advantage, others condemned it as a substitute to be discarded at the first opportunity. Since then, the true merits of G.M.S. have been fully recognised by many and it is now used in the baking trade not as a substitute for fat, but as an ingredient in its own right.

GLYCERYL monostearate is closely related to edible fats and, like them, is composed of glycerine and fatty acids combined. Shortenings, as normally used, are primarily triglycerides in which three molecules of fatty acids are combined with one molecule of glycerine. In a chemically pure monoglyceride, only one molecule of fatty acid is combined with glycerine, while diglycerides have two molecules of fatty acid similarly combined.

CH_2OH	CH_2OR_1	CH_2OR_1	CH_2OR_1
$CHOH$	$CHOH$	$CHOH$	$CHOR_2$
CH_2OH	CH_2OH	$CHOR_2$	CH_2OR_3
GLYCERINE	MONO-GLYCERIDE	DI-GLYCERIDE	TRI-GLYCERIDE

The symbols R_1, R_2, and R_3 represent the fatty acids, which may be the same or different ones.

Commercial G.M.S. is not, in the chemical sense, a pure monoglyceride as its name suggests, but consists of a mixture of mono, di, and triglyceride of which the active emulsifying principle is the monoglyceride, which represents 33 to 40 per cent. of the whole.

There are two main types of glyceryl monostearate available, one which is self-emulsifying and the other not. The former contains up to 6 per cent. of the sodium salt of the fatty acid, which enables it to be emulsified by beating with hot water, and the latter may contain either calcium stearate or is entirely soap free. Commercial monoglycerides of over 90 per cent. monoglyceride content can be prepared by a process of molecular distillation, but as yet this has been successfully achieved only in the U.S.A.

A typical analysis of commercial G.M.S. is as follows:

F.F.A. (as oleic acid)	< 0·4 per cent.
Soap	As required
Moisture	< 1·5 per cent.
Lea figure	Nil
Kreis test	Negative
Melting point ..	54-57°C.
Saponification value	178-184
Monoglyceride ..	≠ 32·5 per cent.
Free glycerine ..	< 5·0 per cent.
Colour 1" cell ..	≠ 12·0Y, 2·0R

Manufacture of G.M.S.

The fatty acids contained in normal fats differ widely in melting point and properties. In order to isolate the higher melting point stearic acid and palmitic acids, the fats are saponified and the fatty acids and glycerine collected separately. The solid and liquid fatty acids are then separated by a repeated pressing process. It is the triple pressed stearic acid that is esterified with special cakemakers' (B.P.) glycerine in the manufacture of glyceryl monostearate.

The esterification is carried out with agitation under vacuum, either in the presence of a catalyst, or a longer heating stage without it, until the fall in the free fatty acid content indicates completion of the process. In order to obtain a satisfactory colour and to retain a low free fatty acid content, the vacuum is broken with nitrogen, and the batch cooled as rapidly as possible.

The final stage is the solidification of the product. It may be sprayed in air to form a powder, chilled on a water cooled drum and removed as flakes, or allowed to set in a solid block.

Monoglycerides of different properties can be prepared by reacting oils and fats instead of stearic acid with glycerine, when the properties depend upon the fat used. Such products have specialised uses and, owing to the complexity of the varieties of products that can be prepared, much may yet be discovered about the use of monoglycerides, as only the stearate has been studied in detail.

Uses in Bakery Products

The present tendency to manufacture bread in a plant bakery and distribute it over a wide area has concentrated attention on means to ensure that the bread will arrive at the customer in good condition. The problem has been most acute in the U.S.A., where distribution is over a wide area and popular demand requires a tender loaf. This has been met, in a country where fat is plentiful and widely used in bread, by the use of bread softeners. The multiplicity of ingredients used, many of recent discovery, led to a public enquiry—The Bread Standards Investigation — which has been widely reported in the British technical Press. The results of this enquiry ended in many of the so-called "bread softeners" being excluded on nutritional grounds, but a complete clearance was given to glyceryl monostearate.

In Great Britain, glyceryl monostearate has been widely used by bakers. The initial impetus was given by fat rationing and its use is likely to continue on economical grounds and performance when fat is freely available. G.M.S. is well known as an emulsifier in the preparation of synthetic cream, greasing emulsion, and similar products, and is widely used in the production of bread, sponges, and cakes.

Four-hour doughs—bread. *Left:* **Without shortening or G.M.S.** *Centre:* **Shortening at 2 lb. per sack.** *Right:* **13 oz. G.M.S. per sack as 1·5 emulsion.**

Fermented Goods

Bread and Rolls.—G.M.S. is most effective when used in the form of an emulsion made with five to 10 times its weight of water. On a small scale, the emulsion is prepared by adding self-emulsifying G.M.S. to water at a temperature higher than 190°F. in a bowl of a vertical cake mixer and beating until a firm emulsion is formed, taking approximately 10 minutes. The emulsion is normally set aside to cool, though it could be used warm, provided care is taken not to overheat the yeast and dough.

In the plant bakery a one to five parts water emulsion is formed in bulk using the dough mixer, but under these conditions it is important to use powdered G.M.S. of fine particle size to ensure rapid dispersion and a homogeneous emulsion. The heating time will depend upon the efficiency of the machine, but should be completed in approximately 30 minutes.

The emulsion is added to the bread in the doughing stage, being used at the rate of $\frac{1}{4}$ to $\frac{3}{4}$ lb. of powdered G.M.S. to each sack of flour.

It is possible to sieve powdered G.M.S. with flour and dough in the usual way, but the results are less satisfactory than when an emulsion is used, and practical tests have shown that in such cases a longer final proof is required to get the best results under these conditions.

Comparative tests have been made in which 2 lb. loaves and rolls were prepared with (*a*) G.M.S. at 13 oz. per sack, (*b*) shortening at 2 lb. per sack, and (*c*) bread without softener or shortening. This range was prepared using both the present white flour and 80 per cent. extraction flour under a variety of conditions, including short fermentation and no-time doughs, 4-hour straight doughs, 4-hour sponge doughs, and also Scottish batch bread.

In all cases, though to a lesser extent in Scottish batch bread, the presence of G.M.S., and fat to a slightly less extent, produced a larger loaf of increased softness, whiter crumb, and increased sheen. The difference between the loaves was most pronounced after two to three days' storage, when the softening effect of the G.M.S. was outstanding.

It is the practice of bakers to prepare a separate dough of different composition from their bread for roll production, but the tests outlined above showed that the doughs containing G.M.S. produced satisfactory rolls without change in the formulae.

Fermented Buns.—The advantages obtained by the use of G.M.S. in bread and rolls decreased as the fat content of the doughs was increased. With fermented buns containing $7\frac{1}{2}$ lb. of fat per sack, 13 oz. of G.M.S. per sack was insufficient to obtain the maximum effect, the optimum quantity rising to 4 lb. G.M.S. per sack. Using a larger quantity, a weakness developed in the crumb structure. It was observed that the fermented buns containing G.M.S. had improved keeping properties, crumb colour, and boldness.

With bun doughs containing 15 lb. of fat per sack of flour, the effect of G.M.S. was much diminished and with the rich doughs, such as the bath bun, with 70 lb. of fat per sack, there was no advantage observed in its use.

Sponge Goods

The main ingredients of a sponge recipe are egg, sugar, and flour. While the method of preparation of the sponge varies according to the equipment in bakeries, all methods involve a

Four-hour doughs—rolls. *Left:* **Without shortening or G.M.S.** *Centre:* **Shortening at 2 lb. per sack.** *Right:* **13 oz. G.M.S. per sack as 1·5 emulsion.**

Left: **Sponge sandwich, formula 3, without G.M.S.** *Right:* **Sponge sandwich, formula 3, containing 0·3 per cent. G.M.S., used in powder form.**

whisking stage in which air is beaten into the mix. The quantity and dispersion of the air into the sponge batter is responsible for the final texture of the sponge. Reconstituted spray-dried egg is much less satisfactory than frozen egg for sponge production as it does not whip, and sponges containing it depend upon baking powder for the largest part of their aeration.

As G.M.S. emulsions aerate easily during beating, they have been used in sponge batters. Some methods depend upon its use as an emulsion, while in others it is used as a dry powder.

Both methods of use have been tested in a number of sponge recipes, including a low egg sponge, high liquid sponges, and sponges enriched with fat. Both frozen egg and spray-dried egg were used.

In these experiments the quantity of G.M.S. varied from 0·5 per cent. of the weight of the egg to 1·0 per cent. of the weight of total liquid in the recipe. The range of recipes investigated is given in Table 1.

Recipe 1 was used to investigate the effect of adding G.M.S. at 0·5 per cent. of the egg level as an emulsion (1 in 10) and as a dry powder at the whisking stage. The results were compared with a sponge made without G.M.S.

It was found that the addition of the emulsion depressed the whipping properties of the frozen egg and gave a sponge inferior to the control. When added as a powder, however, G.M.S. gave a better sponge than the control, having increased volume and a finer, softer texture. The softening becomes more pronounced during storage.

Using recipe 2, containing dried egg, the G.M.S. emulsion had the reverse effect and improved the whipping properties of the sponge mix and in this case both the emulsion, and to a greater extent the G.M.S. powder, gave the advantages noted in the earlier experiments.

TABLE 1

Ingredients	*Basic Recipe No.* 1	2	3	4	5	6
Frozen Egg	16		16	10		10½
Dried Egg	—	5	—	—	5	—
Sugar	16	14½	16	11	38½	13⅓
Water	2½	17½	—	25	60	3⅓
Glycerine	1	—	—	—	—	—
Salt	—	1	½	—	—	—
Sugar	—	—	—	24	—	—
Baker's Syrup	—	8	—	—	—	—
Cream Powder	—	1½	—	—	2½	—
Special Cake Flour	16	20*	16	30	60	13½
Baking Powder	⅛	—	1 tsp.	1⅛	—	⅛
Water	—	5	8	—	5	—
Bicarbonate of Soda	—	½	—	—	1½	—
Melted Margarine 140°F.	—	—	—	—	—	4
Approximate Composition						
Flour	100	100	100	100	100	100
Sugar	100	100	100	117	64	102
Egg (Whole)	100	100	100	33	33	124
Liquid (Egg and Water)	115	150	150	117	117	150
Margarine	—	—	—	—	—	30

* National Flour.

Notes. 1. Whisk to full volume.
2. & 3. Mix or dissolve and stir in.
4. Mix and fold in.

Left: **1 lb. cake formula (b), no G.M.S.** *Right:* **1 lb. cake formula (b) with G.M.S.**

TABLE 2

Ingredients	*Typical Madeira* (*a*)		*High Liquid* (*b*)		*Slab* (*c*)		*Slab* (*d*)	
National Flour	300		—		—		264	
Special Cake Flour	—		288		198		—	
Sugar	360		384		330		264	
Milk Powder	24	1	36	1	8·8	1	6	1
Salt	—		6		—		6	
Cake Margarine	300		288		198		264	
G.M.S. (Powder)	18·4		18		11·9		13·5	
Egg (Whole)	360	2	336	2	231	2	264	2
Water	30		45		—		57	
Water	150	3	210	3	88	3	45	3
Glycerine	—		—		—		12	
National Flour	300		—		—		—	
Special Cake Flour	—	4	192	4	132	4	168	4
Baking Powder (2 : 1)	18		19·5		—		6	
Composition:								
Flour	100		100		100		100	
Fat	50		60		60		61	
Sugar	60		80		100		61	
Egg	60		70		70		61	
Liquid	94		130		100		87	

Notes. 1. Sieve and mix on low speed ½ min.
2. Mix and add over 1 min., cream 4 min. on 2nd speed, scrape down 3 min. 2nd speed.
3. } Add ½ water, add 4 mix then remaining water and clear.
4. }

Recipes 3, 4, 5, and 6 were chosen as representative types of recipes of high liquid, high sugar-low egg, low sugar-high egg, and enriched sponge to determine the optimum quantities of powdered G.M.S. to use. A range of 0·3, 0·5, 0·75, and 1·0 per cent. of the total liquid (egg and water) was used, the G.M.S. being added at the whisking stage. It was concluded from these experiments that in the production of sandwiches a level of 0·5 per cent. of the liquid was sufficient, but a higher concentration of 1 per cent. in recipes 4 and 5 gave optimum results in Swiss roll production. Recipe No. 3 is not suitable for Swiss rolls.

Cakes

The process of cake making, like sponge production, depends upon efficient aeration by beating during the preparation of the batter. It differs from sponges in that it is the fat and not the egg which takes up the air. A cake batter is a complex emulsion of the fat and egg in which the flour and other ingredients are dispersed.

When the liquid content of the batter is relatively low, emulsification of the batter is not difficult. In recipes where the liquid is in excess of the flour and the sugar content is high, a different condition exists and it is necessary to utilise emulsifier shortenings for the manufacture of high ratio cakes.

At the present time, a large number of cake recipes are in use which, though not "high ratio," do have a high liquid content. Tests were therefore made to determine whether there were any advantages to be gained by the use of G.M.S. in cakes of this type, and also in slab cakes.

Four recipes were chosen for the experiment:

(*a*) A typical Madeira cake.
(*b*) A high liquid cake.
(*c*) A slab cake of good quality without baking powder.
(*d*) A slab cake of average quality.

In all cases a batch of cake was prepared without the use of G.M.S. for direct comparison. (See Table 2.)

It was found when using recipe (*a*) that there was no obvious difference between the cakes prepared. With recipe (*b*), of higher liquid content, the cake containing G.M.S. was superior, having increased volume, improved texture, a cleaner and whiter crumb, and less tendency to crumble.

In the slab cake tests, slab (*c*) was prepared without baking powder. The emulsifier opened up the otherwise somewhat close structure and gave a bolder and less crumbly cake. The eating qualities were improved by being shorter eating and not "balling" in the mouth. With slab (*d*), similar improvements in appearance were noted, though the eating properties did not, in this case, seem improved.

These results suggest that G.M.S. is likely to prove of advantage in cakes where the liquid content is in excess of the flour and in slab cakes, to reduce the tendency to crumble. It was observed in all these tests that in the presence of G.M.S. the egg was more rapidly incorporated into the batter, which may have the effect of speeding production.

Summary and Conclusions

Self-emulsifying G.M.S. has been found to be of advantage in fermented goods where the fat content was up to 15 lb. per sack of flour, in sponge goods, and in certain cake formulae.

When used in fermented goods, it is most effective in the form of an emulsion, but for sponges and cakes direct use as a powder produced the best results.

All photographs in this article are Leonard Hill copyright.

Correspondence

To the Editor,
FOOD MANUFACTURE

DEAR SIR,—May I refer to the note by Mr. Doggart, a London surgeon, which appeared in FOOD MANUFACTURE September issue. The fact that diabetics have their own organisation, the Diabetic Association, should not cause fear but dispel it. The Association's aim is to help diabetics to understand the diabetic way of life so that they can behave normally and play an active and useful part in the world as citizens. The good or well-trained diabetic is not a liability but an asset both in industry and society generally.

Yours faithfully,
L. H. ROGERS,
Welfare Secretary,
The Diabetic Association.

152, Harley Street,
London, W.1.

Jelly Strength Testing

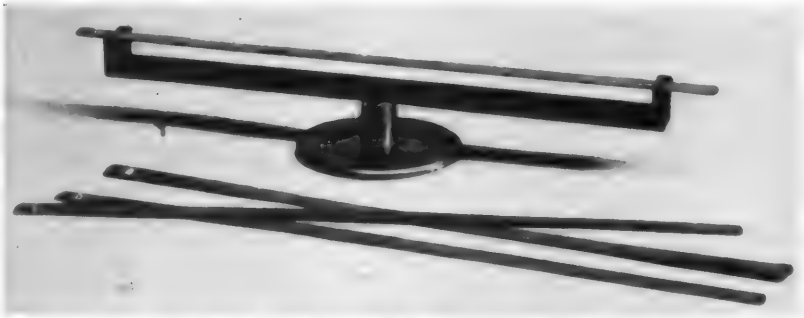
Recent investigations by the British Gelatine and Glue Research Association have resulted in three improvements to the methods of jelly strength testing given in B.S. No. 647-1938 (Glues) and B.S. No. 757-1944 (Gelatine). Both these standards are based on the use of the Bloom gelometer to measure the load required to push a plunger, 12·7 mm. diameter, 4 mm. into a jelly prepared and matured under standardised conditions.

AS a result of the work carried out by Mr. D. Fysh, who is in charge of the technical laboratory of the Association, and Mr. A. G. Ward, Director of Research, assisted by Mr. D. J. Goodwin and Miss J. W. Eastoe, it has been shown that discrepancies in jelly strength testing can be eliminated by attention to three points:

1. The radius of the edge of the gelometer plunger must not depart from the specification figure of $\frac{1}{64}$ in. Errors due to incorrectly made plungers have been observed to exceed 10 g. Bloom.

2. A device called the "Dummy Bloom" has been developed which uses the elastic behaviour of spring steel to standardise the performance of Bloom gelometers. By means of it a continuous check on errors arising from the instrument is secured.

3. The Association has standardised two gelatines (184 and 102 g. Bloom at $6\frac{2}{3}$ per cent. concentration) and one bone glue (85 g. Bloom at $12\frac{1}{2}$ per cent. concentration) for use as primary standards of jelly strength. These may be used to check the preparation and maturing of jellies, and also as an overall test of the Bloom method. These standards are available from the Association's Laboratories.



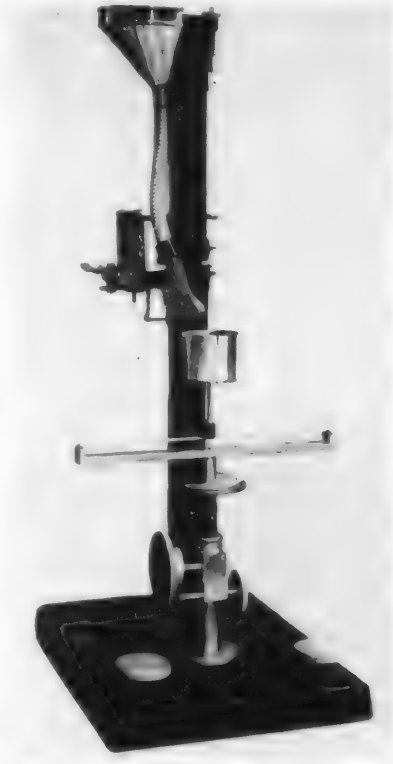
Commercial version of the Dummy Bloom device.

Procedure for the Test

High grade materials are tested at $6\frac{2}{3}$ per cent. concentration, and lower grade ones at $12\frac{1}{2}$ per cent. These concentrations are achieved by weighing out 7·5 g. or 15 g., as required, into special bottles, and soaking the gelatine or glue in 105 ml. water. The swollen gelatine or glue is dissolved by warming it in a water bath, without allowing the temperature of the solution to exceed 60°C. The solution is placed in a thermostat accurately controlled to 10°C. ± 0·1°C. to set, and mature for 16 to 18 hours. The bottles are then removed one by one and tested. The effective temperature of the jelly during the actual measurement is still 10°C.

An ebonite plunger, 12·7 mm. in diameter, is forced into the surface of the jelly by being loaded with lead shot which is discharged at a fixed rate. When the plunger has travelled 4·00 mm. from its initial position, just in contact with the jelly surface, an electrical contact is made which operates a device cutting off the flow of lead shot. The weight which has been discharged is the Bloom jelly strength of the sample.

The Bloom jelly strength of a jelly formed by a gelatine or an animal glue depends on the grade of material, and also on its concentration, on the temperature of the jelly, and on its age and thermal history. If, therefore, jelly strength measurements are to be made to distinguish between different grades of material, the remaining factors must be carefully controlled.



Bloom gelometer with Dummy Bloom device *in situ*.

Photos Griffin and Tatlock.

From the above description it can be seen that the test falls into two parts, the making and maturing of the jelly under specified conditions, and the measurement of its "strength" with the gelometer. Serious errors in the grading can arise from incorrect performance of either part of the test.

In addition to examining the importance of various aspects of the procedures, the Association has developed a device known as the "Dummy Bloom," which permits a direct check to be made of the accuracy of the Bloom gelometer itself, independently of any errors arising from the making and maturing of the jellies.

The Dummy Bloom Device

The Dummy Bloom device is a spring steel strip, supported at each end. It is "tested" in the same way as a jelly, the plunger of the gelometer being brought into contact with the mid-point of the spring, and the flow of lead shot started. The weight of shot in the receiver after the cut-off has operated should agree with the

calibrated value which is supplied with the strip. Any errors in the functioning or adjustment of the instrument are at once shown. The Dummy Bloom has four calibrated strips, enabling the gelometer to be tested in different parts of its range.

This device has proved of the greatest importance in tracing the origin of discrepancies and in maintaining a high level of accuracy, and is now being manufactured commercially. The device is also of value for checking the Boucher jelly tester.

Plunger Profile

The Dummy Bloom behaves differently from a jelly in one important respect. The result of a gelometer test using the Dummy Bloom does not depend on the profile of the plunger of the instrument, whereas the apparent strength of a jelly is influenced by it. Both British Standards require that the corner between the sides and bottom of the cylindrical plunger should be rounded off with a radius of curvature of $\frac{1}{64}$ in. Errors in this radius can cause over 10 g. error in the Bloom jelly strength.

Gelometers are known to be in use with a plunger having a $\frac{1}{16}$ in. radius curve on the bottom edge. Since errors from this source are not detected by the Dummy Bloom, it is necessary to make sure the radiusing is correct. No further trouble from this source need be expected when a correctly radiused plunger is fitted. Measurement of the radius by means of a projection microscope is one method of making a satisfactory check.

Standard Jelly Strength Samples

The Association has also produced a set of standard jelly strength samples. With their aid, the overall accuracy of the whole test procedure can be checked, and this, coupled with examination of the plunger profile and a check of the gelometer functioning by means of the Dummy Bloom, enables all errors in the testing to be traced and eliminated, so that a high and uniform level of accuracy is achieved. All laboratories concerned with gelatine and glue following these precautions should obtain concordant results. The samples are not intended for day-to-day use, but are sold as primary standards, the function of which is to verify the whole of the test procedure and to standardise secondary, internal standards in each laboratory. These secondary standards should then be measured with the samples as a daily routine.

(Concluded at foot of next column)

Food Standards in S. Africa

THE work of the various sections of the South African Bureau of Standards is reported in the seventh annual report of the Council for the period January 1 to December 31, 1952.

The activities of the Food and Feeds Section have continued to expand, particularly as a result of the increased interest of manufacturers and consumers in the Mark Scheme as applied to food products, and in the testing facilities which the section has at its disposal.

The preparation of specifications for annatto and ice cream has continued. Work on the evaluation of three methods for the detection of unpasteurised or inadequately pasteurised ice cream, based on the phosphates reaction, was satisfactorily completed.

The specifications for canned ham and beef roll, ham roll, liver roll, Oxford sausages, pork and beef luncheon roll, pork luncheon roll, pork sausages and chipolata cocktail sausages, beef and pork luncheon roll, beef sausages, Cambridge sausages, edible lard, Vienna (Frankfurter) sausages, Vienna style sausages, corned beef, ham, poultry, sliced bacon (cooked), and tongue have all been revised.

The committee appointed to prepare specifications for commercial sugars decided to relax the microbiological requirements for commercial sucrose and to prepare a specification for canners' sucrose. The latter is to contain stringent microbiological requirements so that canners utilising this specification as a purchasing specification will be assured of obtaining thermophilic-free sugar for use in non-acid packs.

In addition, specifications for commercial dextrose, liquid glucose, and commercial lactose have been prepared.

At the final meeting of the committee preparing the sugar specifications, the Bureau put forward a new method for the determination of the colour of sugars in solution which should adequately enable the sugar industry to differentiate between the various grades of sugar cane.

The compulsory specifications for canned fish and canned rock lobster have been completed, but work on the voluntary specification for the same products has not been proceeded with, as the manufacturers of canned fish desire that only the compulsory specifications be published at this stage.

During the year, the methods of inspecting canned fruits, vegetables, jams, jellies, and marmalade, packed under the standardisation Mark Scheme, were considerably improved as a result of the work of the Foods Inspectorate Section. Although increases in trained staff have made possible the stationing of full-time inspectors at the canneries of more mark-holders, many samples of foodstuffs have continued to be sent to the Bureau's headquarters for check testing and microbiological examination. It is also reported that there has been an increase of 110 per cent. in the amount of canned foods awarded the mark compared with the number of awards in 1951.

Infants' food, ice cream, and mineral waters for which specifications are being prepared were subjected to microbiological examinations, as were canned vegetables, canned fruit, jam, poultry feeds, disinfectants, gelatine, tomato sauce, and canned meat products.

Having become better acquainted with the benefits of standardisation, South African manufacturers are availing themselves of the services offered by the Bureau and are making increasing use of the standardisation Mark Scheme.

Processing Vegetables in the U.S.A.

Part I

The canned vegetable industry in the United States owes its relatively high productivity primarily to the extensive use of labour-saving machinery and equipment. In the best equipped canneries, and these are not necessarily the large ones, there is a minimum of hand labour. Where feasible, the vegetable is both prepared and filled into cans by machinery and the succeeding operations, such as the sealing of the cans, retort control, can labelling, and casing, are almost invariably carried out by automatic machines and equipment.

APART from the use of labour-saving plant and equipment, increased productivity has also been attained through the use of materials-handling devices. The raw materials are transported from one operation to another by roller and belt conveyors, hand trucks, and water flumes. Cartons of canned vegetables are moved to storage by mechanical lift trucks and by gravity or powered conveyors. In some canneries, the cases are stacked in the warehouse by portable case stackers.

Factory performance data from 12 canneries processing mushrooms, peas, asparagus, whole tomatoes, tomato juice, and tomato purée have been surveyed, most of them being multi-product plants.

Plant Layouts

Some plants process only seasonal vegetables, and when the vegetable growing season ends, they suspend operations until the next canning season. Other plants extend the length of their canning operations by the addition of non-seasonal products.

The canneries concerned have excellent plant layouts. These are generally arranged to permit the vegetables either to be flumed or mechanically conveyed directly from the trucks at the receiving platform to the first processing operation, with machines set up in a line leading directly to the closing machine. This machine is placed close to the retorts to minimise the distance the loaded retort crates must be transported for loading.

Some of the canneries do not label the product during the canning season. After the product has been processed and cooled, the unlabelled cans are cased in unsealed cartons and stored in the warehouse. At the end of the packing season, the cans are taken from storage, labels are attached, and the cans repacked and sealed. Certain canneries sell their products to brokers who usually supply their own labels which are placed on the cans at the cannery.

All operations, from the receipt of the raw product at the cannery through casing, have been grouped into six key operations in this report.* These are receiving, preparation, filling, sealing, thermal processing, and labelling and casing.

CASE STUDIES

Presentation of Data

The preparation of these survey data involved three major steps. A schedule was prepared calling for data on man-hours, production, and related factors. In the preparation of this questionnaire, the advice and counsel of recognised authorities in management and trade associations were obtained. Following careful checking and clearance by the United States Bureau of the Budget, the schedules were taken to the companies co-operating in this study. Data were gathered by personal conferences with top officials from the companies' records and experience. Finally, the data were evaluated, selected, and arranged into case-method studies as here presented.

The results show the average number of man-hours actually required in a certain period to process one dozen cans of a specific product for the plant as a whole, and for certain key operations. The man-hour figures include those of workers directly employed on the various operations, and also those not directly employed on any one operation, such as workers engaged in supervisory, maintenance, and other similar functions. The data do not include the man-hours of persons engaged in office work, selling, and other general administrative duties.

The total man-hours and those by operations for each product were obtained from either the payroll report or factory time cards. In a few instances, because of a product mix, it was necessary to allocate man-hours to the product and operations. This was done by obtaining the ratio of the reported product to all products produced in the reporting period. This quotient then was applied, with proper allowances for the weight of different size cans, to the actual total factory man-hours to obtain the total number of man-hours required to process the reported product.

Man-hours by operations were obtained, where necessary, by applying the same ratio to the total actual number of hours charged to a specific operation.

The Case Study Method

The "case study" method of presentation has been used wherever possible. Unless otherwise noted, figures refer to actual plants and operations. Averages which may be computed from the data should be handled with ex-

* Abstract of Case Study Data on Productivity and Factory Performance, by E. L. Herbert, Division of Productivity and Technological Developments, Bureau of Labour Statistics, U.S. Department of Labour.

Stainless steel mushroom processing equipment, showing grader, storage tanks, and blancher.

treme caution because the firms comprising these case studies may not necessarily be representative of the whole industry, nor are the products homogeneous.

MUSHROOM PROCESSING

A partial description of some mushroom processing operations in selected plants is presented here. No attempt is made to describe any operation completely. Rather, the purpose is to show some of the techniques used in four mushroom processing plants. The direct unit man-hour requirements by selected operations are presented in Table 1.

It is not possible to make direct comparisons of the operations between the different plants in this report because the same steps in each operation are not uniform among the plants. In several of the plants certain steps are omitted in one operation but are carried out in a later one.

Receiving the Mushrooms

Fresh mushrooms are delivered by trucks to the canneries, where they are weighed and then taken either to the cutting table for immediate processing or to the refrigeration room for temporary storage.

Direct man-hours were obtained from three of the plants, the fourth plant being unable to supply man-hour data for this operation. Direct man-hours, per dozen 4 oz. cans, at the three plants are:

Plant A	0·0132
Plant B	0·0064
Plant C	0·0117

The receiving operation for the four plants are described below:

Plant A.—The incoming mushrooms are weighed by the receiver. Handlers take the mushrooms from the weigher, place them on platform hand trucks, and move them to the cutting tables.

Plant B.—The mushrooms are delivered to the cannery in baskets. The baskets are taken from the truck and placed on skids. A mechanical lift truck moves the skid from the receiving platform to the refrigerator room.

Plants C and D.—Both plants utilise their truck drivers to unload mushrooms into the refrigeration room.

Preparation prior to Canning

Under "preparation" are included cutting, cleaning, grading for size, and blanching. An exception to this sequence is plant C, for which unit man-hour requirements for grading and blanching are not included in the preparation of the mushrooms for the can. The description of the work flow in this cannery, however, includes its grading and blanching techniques. Conveyors and water flumes are used extensively to deliver mushrooms from cutting tables to the mechanical grader and to the blancher.

Direct man-hours were obtained from all four plants for this operation. They are:

Plant A	0·2045
Plant B	0·1256
Plant C	0·2170
Plant D	0·2425

Plant A.—Cutters with hand knives clean and prepare the mushrooms which are then thrown into a water flume which carries them to a roller conveyor. This is the first inspection point. The inspectors clean the mushrooms further when necessary. From this inspection point the mushrooms move on a roller conveyor to an elevator conveyor which carries them into a mechanical size grader. The mushrooms drop by size through the perforations into tanks of water. A blancher operator takes the graded mushrooms from the tanks and places them in trays. The trays are carried on

TABLE 1

DIRECT MAN-HOURS BY SELECTED OPERATIONS IN FOUR MUSHROOM PROCESSING PLANTS, U.S.A., 1951

Plant	*Direct man-hours per dozen 4 oz. cans by operation*					
	Receiving[1]	*Preparation*[1]	*Filling*	*Sealing*	*Thermal processing*	*Labelling and casing*
A	0·0132	0·2045	0·0341	0·0077	0·0026	0·0184
B	0·0064	0·1256	—[2]	—[2]	0·0409[4]	0·0172
C	0·0117	·2170[3]	0·0746[5]	0·0075	0·0038	0·0274
D	—[6]	0·2425	0·0475	—[7]	0·0030	0·0153

[1] Man-hours are given in terms of one dozen 4 oz. cans, although at this point the mushrooms have not been placed in cans.
[2] Included in thermal processing
[3] Includes grading and blanching.
[4] Includes man-hours expended for filling and sealing
[5] Man-hours for grading and blanching are not included.
[6] Information not available.
[7] Included in filling.

a roller conveyor through the blancher, which is an enclosed tunnel about 12 ft. long and 1½ ft. high, in which the mushrooms are subjected to a steam pressure of four pounds. As the trays of mushrooms emerge, they are sprayed with cold water to permit handling, and placed in front of the fillers.

Plant B.—The baskets of mushrooms are moved from the refrigerated room to the cutting tables on roller conveyors. As the mushrooms are cut they are thrown into water conveyors which perform the dual function of cleaning and moving. Whole mushrooms, buttons, and stems are separated by hand. The buttons are moved to the size grader by conveyor. As the mushrooms emerge from the grader they drop on a stainless steel belt table for inspection before the blanching process. After blanching, they are again inspected and taken to the fillers.

Plant C.—The cutting section is elevated about 3 ft. above the floor level plant to facilitate the use of water flumes. Cutters get the mushrooms from the refrigerated room and dump them on the cutting tables. The cutters sit on each side of the cutting table which has two water flumes in the centre, one for stems and pieces, the other for whole mushrooms.

The individual flumes at each table run into lead-off flumes, one of which sends the whole mushrooms to a grader the other routing the stems and pieces to the blancher. As the women cutters clean and cut the mushrooms, they toss them into the proper flumes. The whole mushrooms are flumed to a grader elevator which carries them into a grader which separates them by size. The grader is a perforated metal tube about 15 ft. long and 3 ft. in diameter.

The mushrooms drop through the grader into holding bins filled with water. Each bin holds mushrooms of specific graded sizes. As a specific size mushroom is to be blanched, an operator opens a valve on the holding bin and the mushrooms are flumed to the blancher. After emerging from the blancher, they drop on an inspection and filling table. As the mushrooms are inspected, the acceptable ones are pushed along by hand to the fillers.

Stainless steel tables from which the mushrooms are filled into cans.

Plant D.—Baskets of mushrooms are moved to the cutting department where they are weighed and placed on the cutting table, having a convevor belt running parallel to the table. The cutters, equipped with small hand knives, are placed along both sides of the table. These operators cut off roots and dirt and cut the stem from the button. The high quality buttons are placed on the conveyor belt; the inferior buttons and the stems are placed in baskets and collected from the cutters. The conveyor belt moves the high quality buttons to a button washer and dumps them into the water, where they are mechanically graded for size and dropped into tanks. Then, one-size buttons at a time are passed through the steam blancher to the filling stations by a belt conveyor. The buttons are inspected before filling.

Further mushroom processing equipment showing retorts, sealing machines with syruper, and "salt tablet" depositing machines.

Filling the Cans

Mushrooms are moved from the blancher to the filling tables to which empty cans are brought by a conveyor. The filling operator (or "filler") takes an empty can from the conveyor, places it on a scale, hand-fills the can to its

proper weight, and places the filled can on a conveyor belt leading to the closing machine.

Separate man-hours could not be obtained for this operation from each of the four plants (as shown in Table 1, parts of this operation for two of these plants are included in other operations). Direct man-hours were obtained from the following three plants:

Plant A	0·0341
Plant C	0·0746
Plant D	0·0475

Plant A.—Empty cans are brought from a loft to the filling table by a conveyor so placed that it runs past the table. The filler takes an empty can from the conveyor belt, places it on the scales on the filling table, hand-fills the can with mushrooms to its proper weight, and places it on a belt conveyor leading to the closing machine. Water is added to the can of mushrooms by a syruping machine before closing.

Plant B.—A gravity washer-conveyor brings the empty cans from a loft to the filling section, washing them *en route*. The filling tables are arranged on both sides of a conveyor belt which conveys the cans to the fillers. A filler will take a can from the belt, place it on the scale, hand-fill the can with mushrooms, and place it on another conveyor belt leading to the closing machine. Just before sealing, the can is filled with water and a salt tablet is automatically placed in the can by a mechanical dispenser.

Plant C.—As the mushrooms leave the blancher, they drop on a filling table to be inspected. They are then hand-pushed along the filling line to each succeeding filler by the previous filler. Each can is hand-filled, weighed, and placed on a conveyor belt leading to the closing machine.

Plant D.—In front of the fillers run two conveyor belts. One belt brings the empty cans to the filler; the other brings the buttons. The cans are hand-filled, weighed, and placed on a conveyor belt leading to the sealing machine. On the way to the closing machine the cans are filled with brine piped down from an overhead brine tank.

Sealing the Cans

The filled cans of mushrooms are moved from the filling tables into the automatic closing machine on a mechanical conveyor. After the machine has sealed the lids on the cans they are placed in retort crates for transportation to the retort for processing.

In this particular operation only two of the plants were able to determine direct man-hours. They were:

Plant A	0·0077
Plant C	0·0075

Information regarding this operation for plants B and D is given in Table 1.

Plant A.—Attached to the sealing machine is a salt tablet dispensing machine which drops one tablet into each can just before it is sealed. The sealed cans are removed from the closing machine table and placed uniformly in a metal retort crate by an electrically powered magnet which can lift as many as 20 cans at a time.

Plant C.—The cans of mushrooms move from the filling table to the closing machine on a belt conveyor. As the sealed cans emerge from the closing machine, they drop haphazardly into a retort crate. The cannery considers this practice to be time saving and allows for more efficient thermal processing because a greater can area is exposed to steam.

Thermal Processing

In the thermal processing operation the retort crates are placed in pressure retorts and subjected to live steam under pressure for varying periods of time. At the end of the processing time the cans are cooled immediately to arrest the cooking process.

Direct man-hours were obtained from all four plants for this particular operation. Man-hours for Plant B include those for the filling and sealing operations and hence are much larger than those for the other three plants.

Thermal processing data were obtained from four mushroom processing plants (Table 2).

Plant A.—The retort operator uses an overhead rail crane to bring the retort crate to the retort. The crate is lowered into the retort and the cans are subjected to steam treatment at 245°F. for 30 minutes. Cold water is then admitted to the retort and the cans are allowed to cool for approximately 10 minutes. The crate is removed from the retort by the same overhead crane and deposited on a dolly which is pushed to the labelling machine.

Plant B.—The retort crates are placed in an upright retort and processed by steam for 20 minutes at a temperature of 250°F., after which the retort is flooded with cold water for five minutes to permit the cans to cool. The retort is then opened and the crates are removed, placed on three-wheeled trucks, and wheeled into the labelling section.

Plant C.—The retort crates are lifted by an electric hoist and carried to the retort. The hoist deposits the crates in a vertical retort which is operated with steam under pressure. The cans are thermal processed from 23 to 25 minutes at 240°F. The steam is then shut off and the pressure is released from the retort. The crates are removed from the retort by the same electric hoist and then lowered into the cooling pit which is filled with cold water.

Plant D.—The retort crates are taken from the sealing machine and placed in the retorts by an overhead crane. The cans are processed by steam for 15 minutes at a temperature of 250°F. The crates are then removed from the retort by the same overhead crane, placed on dollies, and taken into the warehouse for drying and air-cooling.

TABLE 2

THERMAL PROCESSING DATA FOR FOUR SELECTED MUSHROOM PROCESSING PLANTS, U.S.A., 1951.

Plant	*Pressure pounds per square inch*	*Process temperature degrees F.*	*Process time minutes*	*Method of cooling*
A	15	245	30	Retort is flooded with cold water
B	15	250	20	,, ,,
C	15	240	23-25	Cooling pit
D	15	250	15	Air-cooled

Labelling and Casing

After cooling, cans are either labelled immediately or stored in the warehouse to be labelled later. All four plants use an automatic labelling machine. Two of the plants have automatic case packers and sealing machines; in the other two plants the cases are packed and sealed manually.

For this operation all four plants reported their direct man-hours as follows:

Plant A	0·0184
Plant B	0·0172
Plant C	0·0274
Plant D	0·0153

Plant A.—The cans are removed from the crate by an electrically powered magnet, and hand-fed to the automatic labelling machine. After the label is applied, the cans roll along a straight roller conveyor to a semi-automatic case-filling machine. An operator places an empty carton against the machine and kicks a foot lever twice, each time pushing 12 cans into the carton. The operator then places the carton on a conveyor which carries it to a case-sealing and compression unit. This machine glues and folds the flaps of the carton, and the compressor then applies pressure to the glued surface to make the seal secure. At the end of the labelling and sealing line, a worker removes the carton from the conveyor and places it on a pallet which is carried to storage by a fork lift truck.

Plant B.—Labels are attached to the cans by an automatic labelling machine. From the labeller, the cans pass to an automatic can ejector which ejects poorly labelled or defective cans. An automatic case packer packs the cans of mushrooms into a carton which is then glued and sealed by an automatic case sealer. The sealed cartons are placed on a pallet and moved to the warehouse by a lift truck.

Plant C.—The retort crate is taken to the labelling section where the cans are removed manually from the crate by workers and hand-fed to the automatic labelling machine. As the cans are labelled they roll down a conveyor to workers who pack the cartons by hand. Other workers then glue and fold in the carton flaps and place the carton on a conveyor leading into the warehouse.

Plant D.—The cans are labelled by an automatic labelling machine and hand-packed into cartons. Glue is applied to the carton flaps by hand brushes and the carton is sealed. The cartons are then moved to storage on hand-carts.

(To be continued)

A Century of Hippophagy

THE recent prominence given in the daily Press to the transportation of large numbers of Irish horses to the Vaugirard abattoir in Paris served as a reminder of the revival of horse-eating. Condemnation or criticism arose only regarding the method of transport and slaughtering. There was no discussion as to the practice of hippophagy, or to the relative merits of horse-flesh as animal protein in our diet. In freely hinting that cooked meats from abroad may be processed horse-flesh, and that some London restaurants may be serving horse-steaks or entrées, critics were merely repeating what critics were saying a century ago.

Hippophagy may be defined as an old Greek name for the practice of Scythian peoples north-east of the Caspian Sea and for a Sarmatian tribe north of the Euxine. But the hippophagists became really prominent only when George St. Hilaire founded the Society of Hippophagists, when Paris became the centre of the cult 90 years ago. Britain, it is true, had the Act of 1889 requiring all horse-flesh or flesh of asses or mules to be so labelled, an Act fixing a fine of £20 on anyone serving horse-meat when other meat was asked for. But people are asking even today whether "cooked veal" is really veal, or whether it is flesh of donkey, or from horses cruelly submitted in their slaughter to the blood-pump.

Apart from the unpleasant associations with method of slaughtering, hippophagy from the point of view of the history of food is certainly an interesting study. France and Belgium of a century ago were the countries of the hippophagists, a definite trade from recognised shops appearing in 1866. In place of horse-meat for the poor in times of siege or scarcity, *boucheries hippophagiques* were opened, and *banquets hippophagiques* were held —banquets at which dishes had a definite "horsey" origin in their name—indicating that it was no longer the poor who indulged in hippophagy.

France had also the evidence from a number of military campaigns in Russia, in the Alps, and on the Rhine. Active soldiers and the wounded had derived much sustenance from horse-meat, especially during the siege of Alexandria and other critical periods when, of necessity, considerable amounts were eaten. Marshal Massena found *cheveline* soup so good that he asked for it in later years when dining in Paris.

Although Belgium became the most prolific consumer of horse-meat when calculated per head of population, and despite the developments in Germany and in Denmark where it was allowed to be sold in ordinary butchers' shops, France still provided the main scene of hippophagous history. Brillat-Savarin was asked by an eminent surgeon to combat the prejudice which still prevailed: but unlike the chef Chevet he protested that his influence was inadequate.

In the previous century there had been a first effort when Geraud, a famous physician of the time, advocated *cheveline* as others demanded it in the market. Horse-meat was taken for beef; there were no ill effects, though some complaints were made to the police by those who had dined well and regretted afterwards. Parmentier, the eminent physician and economist who gave France the potato as part of the everyday diet, was a member of a commission of 1811 appointed to look into the question of horse-flesh

recommended to be sold in special shops after inspection. The favourable report was too early, with all the prejudice still in evidence, as was the finding of a commission of 1825 which reported horse-meat good and wholesome, hardly different from beef, and even suitable for invalids.

In a lecture to the Society of Arts in 1868 by A. S. Bicknell, in Edward Smith's "Foods" in the 1874 edition, and in other contemporary publications, the progress made in Europe may be traced. Horse-meat was *cheveline* to the French from its early history. It had its champions like Chevet, prince of chefs in 1856, who gave it his support in times when one gourmet's opinion was as good as that of many scientific men.

The Villeroys in 1830 published a complete treatise on hippophagy; Decroix, an eminent veterinary surgeon, became a father of the cult in publishing pamphlets and offering prizes for those opening horse-restaurants and horse-butchers' shops. At a magnificent banquet in 1863 at the Grand Hotel in Paris, over a hundred most distinguished scientific and literary men ate three horses.

The first official horse-meat shops, after the legalisation of the whole business in 1866, were opened in the *Place d'Italie*. Within a year over two thousand horses were consumed in France, with Rollin and Company as the largest dealers. One query relevant even today was raised by Bicknell: where did 200,000 lb. of horse-flesh "disappear" to in London when the corresponding amount of pets' meat was not sold in the shops?

The *boucheries* in Paris and other French cities were patronised by customers who proclaimed a definite preference for horse-meat in place of beef. The phase in France, which reached full proportions by 1880, had its repercussions in England in efforts to establish the practice. At the Langham Hotel in 1868 the "Society for the Propagation of Horse-flesh as an Article of Food" held a much advertised dinner at which the dishes had the full hippophagous flavour. A soup *Consommé de Cheval* was followed by *Filets de Soles à l'huile hippophagique*, and by a copious selection of *hors d'oeuvres* including *Langues de cheval à la Troyenne* and *Gelée de pieds de cheval au marasquin*.

Research at the Mellon Institute

A REVIEW of the many different departments of the Mellon Institute and accounts of the research carried out during the year ended February 28, 1953, are contained in the fortieth annual report of the Institute.

The development of a liquid flow meter, based on one of the three primary actuation methods included in the research programme of the Meter Technology Fellowship, has been completed. This meter has been found to be particularly suitable for the measurement of liquid foodstuffs, and is now being tried out in the laboratory of an American food manufacturer.

Further detailed research has been carried on by the Bone Products Section of the Multiple Fellowship of Baugh and Sons on the factors which affect the performance of sugar refining adsorbents, especially "Synthad," a synthetic granular adsorbent which performs the duties of bone char in sugar refining. Two papers have been published on the subject; in the first, the conclusion reached is that "Synthad" is a valuable refining aid and will replace bone char in cane sugar refining. The second paper discusses some factors affecting porosity and activity of adsorbents. It appears that the rapid loss in area incurred by a new adsorbent during the early cycles of use in sugar refining is due to crystallite growth, in addition to the filling of small pores with residues from the impurities removed from the sugar liquors. After the initial loss of area has occurred, an adsorbent that retains the greater area in the larger pores will give longer service at a higher level of refining power than one that retains an equal or somewhat larger area in small pores. A third paper which has been prepared for publication shows that the heat of wetting of "Synthad" is only about 58 per cent. that of bone char, and that the thermal conductivities and specific heats of the two adsorbents are about the same.

A broad investigation of the nature of the life and death of yeast cells was carried out by the Multiple Fellowship on yeast chemistry. Two conclusions reached were that a yeast dust fraction of currently produced commercial yeast was greatly inferior to the larger particle sizes, and that the standard method of using a sugar pre-treatment step in rewetting and reviving yeast could be omitted without detracting from the performance of the product in bread production. The development of a process and equipment for yeast growth studies will enable the Fellowship to simulate commercial yeast production on a scale small enough to carry on yeast nutritional studies economically in synthetic media and still obtain enough yeast for chemical analyses, drying, and subsequent practical evaluation of stability.

The Multiple Fellowship of H. J. Heinz on food varieties extended their investigation on the mechanism of discoloration of glass packed food purées to analyses of changes in the composition of headspace gases in these products as a clue to chemical changes taking place. An apparatus was modified to make possible the determination of carbon dioxide, nitrogen, hydrogen, and oxygen in less than millilitre amounts of gases.

A new method was developed for measuring the degree of cooking of precooked cereal products, and other activities covered research on the average daily consumption of cereal by infants, and on the optimal shape of cereal cartons. Because of continued interest in the geriatric foods programme, six varieties were prepared and presented for consideration: two meat, two vegetable, and two dessert products.

The Measurement of Air Concentration in Large Steam Spaces during Air Venting

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To achieve uniform rates of heating by means of steam, a basic requirement is the preliminary removal of all air from the steam space. Effective venting of retorts used for the sterilising of foodstuffs is particularly important because successful processing depends on uniform rates of rise of temperature of the components of the load as well as uniform final temperatures. If all the units comprising a load in a pressure steriliser are physically identical, their rates of heating and final temperatures will vary only if there is a variable concentration of air present in the internal atmosphere of the chamber, during a part or the whole of the process. Effective air venting is influenced by many factors, however, and in some cases it may be desirable to measure directly the progress of air elimination. The equipment for the measurement of air concentration described in this article has been found to be of assistance in determining satisfactory air-venting procedures for large vessels used for the treatment of milk in bottles. The method should be applicable to similar problems where large steam spaces must be air-free.

THE temperature of a mixture of water vapour and air in equilibrium with water at the same temperature is governed by the partial pressure of the water vapour. The relationship between temperature and saturated water vapour pressure may be used to deduce the volume percentage of air in a mixture of water vapour and air when the mixture is at a known pressure. Suppose a small stream of the air-steam mixture present in a retort during venting is allowed to flow from a tube passing through the wall of the vessel, and its saturated temperature, measured at atmospheric pressure (760 mm. mercury) is found to be 95·0°C. This temperature corresponds to a water vapour pressure of 634 mm. mercury, so that the difference of pressure of 126 mm. mercury between this value and the total gas pressure of 760 mm. mercury is contributed by air. Hence the volume percentage of air in the mixture is $\frac{126}{760} \times 100 = 16{\cdot}6$. The proportion thus measured at atmospheric pressure is a true measure of air concentration within the steriliser independent of the pressure and temperature at the sampling point.

Measuring Air Concentration

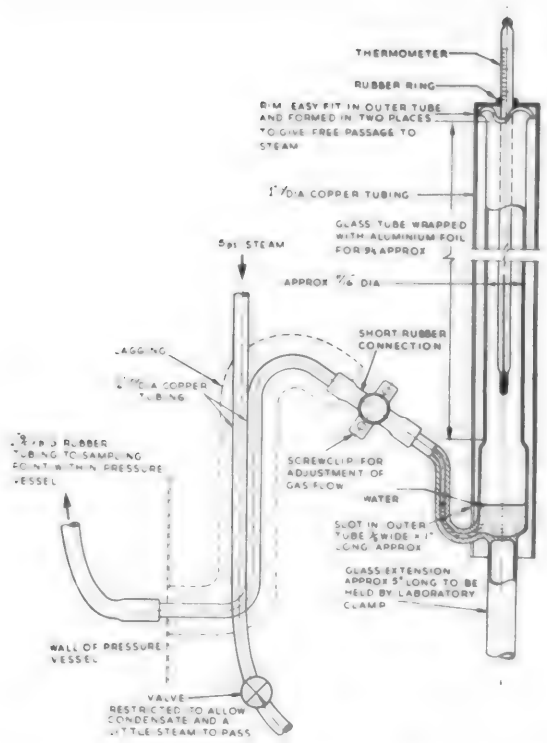
A convenient form of apparatus for measuring air concentration at any point in a steriliser is shown diagrammatically in Fig. 1. A stream of mixed gases enters a rubber tube, the end of which has been previously fixed at the desired point within the pressure vessel, and eventually enters the measuring head, the flow rate being controlled by the screw clip. The measuring head is essentially a shielded thermometer pocket, open to the atmosphere, and jacketed by the gas mixture as it flows to waste. To ensure saturation at atmospheric pressure enough water should be present in the base of the equipment to cover the entrance. If glass is used for the inner tube the presence of sufficient water may be checked visually. The outer jacket also functions as a radiation shield and should therefore be of bright metal. Instead of polishing the internal surface of the jacket, a layer of bright aluminium foil may be wrapped around the glass tube. Ordinary chemical thermometers graduated 0-110°C. are suitable.

Corrections for Atmospheric Pressure

With small concentrations of air in the sampled gas mixture the indicated temperatures are close to the boiling point of water. As this value changes with barometric pressure the temperature which indicates completion of air exhaustion is not always 100°C., but is the boiling point of water at the time and place of the experiment. Both the need for knowing accu-

TABLE 1

	Conditions of experiment		
	Accurate thermometer. Barometer normal.	*Accurate thermometer. Barometer high.*	*Thermometer reading 0·5°C. high. Barometer high.*
Barometric pressure ..	760·0 mm. Hg.	787·6 mm. Hg.	787·6 mm. Hg.
Observed temperature of saturated steam at prevailing atmospheric pressure	100·0°C.	101·0°C.	101·5°C.
Equivalent saturated water-vapour pressure	760·0 mm. Hg.	787·6 mm. Hg.	801·7 mm. Hg.
Observed temperature of an air-steam mixture ..	99·0°C.	100·0°C.	100·5°C.
Equivalent saturated water-vapour pressure	733·2 mm. Hg.	760·0 mm. Hg.	737·7 mm. Hg.
∴ the per cent. air to which the observed temp. diff. of 1°C. would be found to be equivalent is	$\frac{26{\cdot}8}{760{\cdot}0} \times 100$ = 3·53 per cent., *i.e.* 3·5 per cent.	$\frac{27{\cdot}6}{787{\cdot}6} \times 100$ = 3·51 per cent., *i.e.* 3·5 per cent.	$\frac{28{\cdot}0}{801{\cdot}7} \times 100$ = 3·49 per cent., *i.e.* 3·5 per cent.


THERMOMETER
RUBBER RING
RIM EASY FIT IN OUTER TUBE AND FORMED IN TWO PLACES TO GIVE FREE PASSAGE TO STEAM
1" DIA COPPER TUBING
GLASS TUBE WRAPPED WITH ALUMINIUM FOIL FOR 9" APPROX
5 lbs STEAM
APPROX ⅝" DIA
SHORT RUBBER CONNECTION
LAGGING
½" DIA COPPER TUBING
SCREWCLIP FOR ADJUSTMENT OF GAS FLOW
WATER
SLOT IN OUTER TUBE ⅛ WIDE × 1" LONG APPROX
GLASS EXTENSION APPROX 5" LONG TO BE HELD BY LABORATORY CLAMP
WALL OF PRESSURE VESSEL
VALVE RESTRICTED TO ALLOW CONDENSATE AND A LITTLE STEAM TO PASS

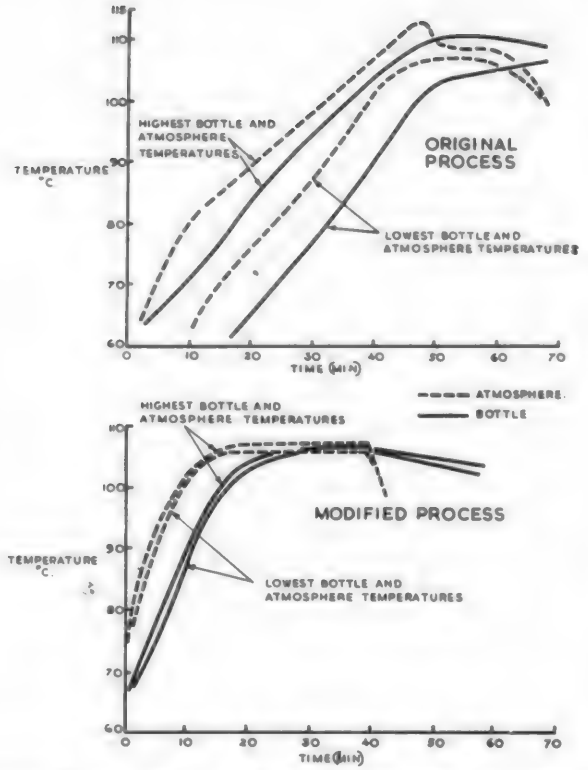


Fig. 1. *(Left)* **Air measuring equipment. Fig. 2.** *(Right)* **Temperatures at hottest and coolest parts of the steriliser atmosphere, and of milk in bottles at these points, for the original and modified processes.**

By permission of the Society of Dairy Technology.

rately the prevailing atmospheric pressure and the necessity for using accurately calibrated thermometers may be avoided if at the beginning of a series of measurements the boiling point of water is first determined. This may be done by passing steam from any convenient source, such as the factory's mains, through the apparatus in the usual way, thus measuring the saturated water-vapour temperature at the existing atmospheric pressure. In the neighbourhood of 100°C. the graduation error on a good class thermometer and the departure of the boiling point of water from 100°C. due to barometric pressure should not together be more than ± 1·5°C.

Over this range the variation in the rate of change of vapour pressure of water with temperature and the influence of variation of the absolute pressure of the system on the calculation may be ignored as may be seen from the worked examples in Table 1. Thus the same difference between the observed boiling point of water and the observed temperature of an air-steam mixture may at all times be taken to indicate the same percentage of air in the mixture. The data given in Table 2 are therefore sufficient for plotting a curve from which air percentages may be read directly.

TABLE 2

PERCENTAGE AIR IN AIR-STEAM MIXTURES SATURATED AT ATMOSPHERIC PRESSURE FOR A RANGE OF DIFFERENCES BETWEEN THE OBSERVED TEMPERATURE AND THE OBSERVED BOILING POINT OF WATER.

Difference between the observed temperature and the observed b.p. of water. Degrees C.	*Air concentration Per cent.*
0·0	0·0
0·2	0·7
0·6	2·1
1·0	3·5
2·0	6·9
3·0	10·3
4·0	13·5
5·0	16·6
10·0	31·0
15·0	43·0
20·0	53·0

Sources of Error

This method is convenient and rapid, and is valuable for investigations under factory conditions. It is neither highly sensitive nor accurate under all conditions, and some understanding of its limitations is desirable.

It will be seen from Table 2 that a temperature difference of 0·1°C. is equivalent to about 0·4 per cent. air at low concentrations, so that measurements to a greater accuracy than ± 0·5 per cent. cannot be expected even if other conditions are entirely favourable.

Any factor which results in a change of composition of the gas mixture by condensation of some of the water vapour before it reaches the measuring head will affect the accuracy of measurement. In experiments using this method, thick-walled rubber tubes were used in the interior of the pressure vessel, and it was assumed that even if the tubes passed through a region lower in temperature than the intake no significant condensation would occur. Under these conditions, no error seemed to be involved, since simultaneous measurement with two sets of apparatus both taking gas mixture from the same point but with a gas flow two to three times greater through one apparatus than the other gave identical results.

The gas leads external to the pressure vessel should be lagged and either very short or heated to

avoid condensation. In the experiments mentioned, it was impossible to have the measuring heads very close to the exit from the vessel, and therefore heated leads were used of the form shown diagrammatically in Fig. 1. In all, six leads were used bunched around a central tube carrying steam at 5 p.s.i., the whole heavily lagged. It may be shown by calculation that even if the gas mixture were superheated by this means to the full temperature of 5 p.s.i. saturated steam only a small error would result from the additional evaporation of water from the measuring head during de-superheating. A true air percentage of 50 would be estimated as 49 and 20 per cent. would become 19·8 per cent.

Change of Composition of Gas Mixture

In making a series of measurements during venting of a steriliser, the composition of the gas mixture entering the temperature measuring head changes continuously until eventually the internal atmosphere of the vessel becomes air-free. If the rate of change is very high the time lag of the thermometer is significant. Fortunately under such conditions observation of air concentration is less important in the early stages of venting than in the final stage when the rate of change of temperature may be expected to be low compared with the response rate of ordinary thermometers. With rapid rates of change some water vapour will also be condensed in heating the water in the measuring head, the head itself, and the thermometer. Whether this results in error can always be determined by doubling or trebling the rate of gas flow.

It is unlikely when working with large vessels that the withdrawal of a continuous stream of gas will affect to any significant extent the composition in the neighbourhood of the sampling point. The technique is not, however, suitable for investigating highly localised conditions such as those in a narrow space between adjacent components of a load.

Almost all sources of error are present with high concentration of air but the errors tend to zero as the last of the air disappears from the system. An accurate indication of the completion of air venting is therefore always given.

TABLE 3

AIR CONCENTRATIONS IN THE STERILISER AS OPERATED ORIGINALLY AND AFTER IMPROVED AIR VENTING

Time in minutes from start	*Per cent. residual air*					
	Top front	*Top middle*	*Top rear*	*Bottom front*	*Bottom middle*	*Bottom rear*
Original arrangement:						
15	39·0	—	—	61·0	32·0	47·0
29	19·0	17·0	19·0	35·0	15·0	30·0
Improved arrangement:						
5	84·0	67·0	86·0+	82·0	86·0–	86·0–
8	20·0	22·0	32·0	16·0	23·0	24·0
11	4·5	5·0	4·5	2·9	2·0	3·2
14	0·9	1·0	1·2	0·3	0·3	0·9
15	0·0	0·3	0·3	0·0	0·0	0·0

Some Results

In Table 3 and Fig. 2 are given data illustrating the improvements which can be obtained in the consistency of treatment of the components of a load by paying more attention to air venting. The information refers to large horizontal sterilisers in which each load consisted of 4,320 one-pint bottles of milk. The upper curves in Fig. 2 referring to the original treatment show that widely differing rates of heating of the components of the load occurred. The bottle which heated most slowly was in a region where the highest air concentration persisted throughout the process, which was at the bottom of the vessel close to the steam inlet-distributors. Calculations based on known rates of thermal destruction of bacterial spores show that the bactericidal effects of the maximum and minimum treatments under these conditions of processing were in the ratio of 8:1.

To achieve the more rapid and complete venting of air shown in the second part of Table 3 the steam flow rate was increased from 1,000 to 2,200 lb./hr., more steam was directed to the front and rear of the vessel, additional air outlets were provided, and the chequer-plate floor replaced by an open grid. The lower curves in Fig. 2 show that the rates of heating of all bottles were greatly improved and moreover the treatment given to each bottle of milk was uniform.

NOTE.—The tables used are those given in "Handbook of Chemistry and Physics," 34th edition (1952-53). Chemical Rubber Publishing Co., Cleveland, Ohio, U.S.A.

THE above drawing shows the $25 million plant to be built by Lever Bros. on a 30 acre site seven miles east of Los Angeles, U.S.A. It will consist of two large manufacturing buildings joined by an office and service unit. One five-story wing will be devoted to soap finishing and packing, shortening, margarine, mayonnaise, and other edible products.

Other major installations will include a processing building, a steam generating plant, storage tanks, cooling towers, and hydrogen plant. A large portion of the processing equipment will be located outdoors, with the automatic equipment installed completely in the open, and that requiring attention by workers protected by roof alone.

Ministry of Food

LATEST STATUTORY INSTRUMENTS

The list given below is the continuation of the list of Instruments published in "Food Manufacture," July 1, 1953, page 260.

No.	*Date. 1953.*	
		PRICE FIXATION
923	June 7.	Order amending the Eggs Order, 1953.
949	July 1.	Order amending the Condensed Milk Order, 1951. Revokes S.I. 1952, No. 1068.
989	,, 1.	Order amending the Barley Order, 1952.
990	,, 1.	Order amending the Wheat (Great Britain) Order, 1951, and the Wheat (Northern Ireland) Order, 1951.
991	,, 1.	Order amending the Rye Order, 1952.
992	,, 1.	Order amending the Oats (Great Britain) Order, 1952, and the Oats (Northern Ireland) Order, 1952. Revokes S.I. 1953, No. 534.
993	,, 1.	Order amending the Dredge Corn (Great Britain) Order, 1951, and the Dredge Corn (Northern Ireland) Order, 1951.
1034	,, 5.	Order amending the Eggs Order, 1953. Revokes S.I. 1953, No. 923.
1095	,, 19.	The Meat (Prices) (Great Britain) Order, 1953. Revokes S.I. 1952, No. 1122.
1096	,, 19.	The Meat (Prices) (Northern Ireland) Order, 1953. Revokes S.I. 1952, No. 1123.
1233	Aug. 9.	Order amending the Eggs Order, 1953. Revokes S.I. 1953, No. 1034.
1255	,, 16.	Order amending the Bacon Order, 1953.
1276	,, 23.	Order amending the Butter Order, 1951.
1295	,, 23.	Order amending the Sugar (Prices) Order, 1952.
		BREAD
1283	Aug. 30.	The Bread Order, 1953. Revokes S.I. 1952, No. 1781.
		CONDENSED MILK
1164	Sept. 1.	Order amending the Condensed Milk Order, 1951. Revokes S.I. 1953, No. 949.
		CONFECTIONERY
146	Feb. 5.	The Confectionery (Records) Order, 1953. Revokes S.I. 1951, No. 2067, and S.I. 1952, Nos. 839, 1504, and 1961.
212	,, 14.	Order amending the Confectionery (Records) Order, 1953.
866	May 31.	Order revoking the Confectionery (Records) Order, 1953.
		DRIED FRUITS
1254	Aug. 15.	Order amending the Dried Fruits Order, 1951. Revokes S.I. 1951, No. 771.
		FEEDINGSTUFFS
1125	Aug. 1.	The Feedingstuffs (Revocation) Order, 1953.
		FLOUR
1282	Aug. 30.	The Flour Order, 1953. Revokes S.I. 1952, Nos. 749 and 2041; S.I. 1953, No. 582.
		HOME-GROWN GRAINS
1126	Aug. 1.	The Home-grown Grains (Revocation) Order, 1953.
		MACARONI
1284	Aug. 30.	Order revoking the Macaroni and Similar Products Order, 1949.
		MALT AND POTABLE SPIRITS
1163	Aug. 1.	Order revoking the Malt (Restriction) Order, 1940, and the Potable Spirits (Licensing and Control) Order, 1944.
		OILS AND FATS
865	May 31.	Order amending the Oils and Fats Order, 1953.
1155	July 31.	Order amending the Oils and Fats Order, 1953.
1277	Aug. 23.	The Oils and Fats (No. 2) Order, 1953. Revokes S.I. 1953, Nos. 210, 865, and 1155.
		POTATOES
1124	Aug. 1.	The Ware Potatoes Order, 1953. Revokes S.I. 1952, Nos. 1389 and 2109.
		RATIONING
797	May 17.	Order amending the Cheese Order, 1950.
914	June 14.	Order amending the Meat (Rationing) Order, 1953.
915	,, 14.	Order amending the Bacon (Rationing) Order, 1953.
916	,, 14.	Order amending the Fats and Cheese (Rationing) Order, 1953.
958	July 12.	Order amending the Fats and Cheese (Rationing) Order, 1953.
1024	,, 5.	Order amending the Meat (Rationing) Order, 1953.
1052	Aug. 9.	Order amending the Sugar (Rationing) Order, 1953.
1247	,, 16.	Order amending the Meat (Rationing) Order, 1953. Revokes S.I. 1953, No. 1024.
1256	,, 16.	Order amending the Bacon (Rationing) Order, 1953. Revokes S.I. 1953, No. 915.
1278	,, 23.	Order amending the Fats and Cheese (Rationing) Order, 1953.
		RICE
829	May 22.	Order revoking the Rice Order, 1950.
		SHIPS' STORES
550	Apr. 1.	Order amending the Ships' Stores (No. 2) Order, 1950. Revokes S.I. 1952, No. 1776.
		WELFARE FOODS
725	May 1.	The Welfare Foods Order, 1953. Revokes S.R. & O. 1947; No. 1673; S.I 1948, Nos. 146 and 791; S.I. 1949, No. 1902; and S.I. 1951, No. 1195.

All about Starch

THAT a work should arrive at its third edition 13 years after its original publication, as has Mr. Radley's book,* is in itself some guarantee of its value; indeed, the period would have been much shorter save for the intervention of the war, a new edition being called for in 1944.

In this new edition, there is an extension of the scheme by which certain topics are dealt with by specialists; thus Dr. S. Peat contributes a section on the biological function of starch; Drs. L. Hough and J. K. N. Jones deal with the chemical evidence for the structure of starch; Dr. R. L. Whistler deals with its retrogradation, while Prof. E. F. Degering makes substantial contributions on the topics of the ethers and esters of starch and of its inorganic and oxidised derivatives.

A new chapter on the waxy cereals and starches (those that stain red with iodine), contributed by Prof. R. M. Hixon and Miss B. Brimhall, constitutes the first comprehensive account of this field. Several other contributors have combined to make the 365 pages composing Part I of this volume probably the most authoritative collection of data yet assembled on the subject of starch.

Part II deals with the amylases and their activity upon starch, and includes a detailed and fascinating account of the industrial preparation of these enzymes. The only criticism that may be made on this score is the confusion between "maize" and "corn" starches engendered by the fact that some contributors reside on one side of the Atlantic and some on the other. This reaches its zenith in Table VI on p. 48, where after both "wheat" and "maize" in the upper half, "corn" is encountered in the lower part next to "wheat" and just above "waxy maize."

Starch is a most important subject both scientifically and industrially, and it is curious that, on the one hand, there is deep penetration into the mystery of its structure and on the other, an industry which produces and uses starch without reference to this structural knowledge. This state of affairs has produced a stupendous task for the author, faced with summarising knowledge in so widely different parts of the same field. Such task, it may be added, has been most successfully accomplished, and all engaged in the study and handling of starch will be grateful to the author and his collaborators.

The whole work is well documented and contains some 6,000 citations to original communications, so that it comprises, *inter alia*, an excellent bibliography on the subject. In addition, the volume is well produced, although I feel that its price is high; this may be symptomatic, not so much of excessive cost, as of the disappearance of the genus "book buyer" in favour of that lower form of life the "book-borrower." In general, this work can be recommended without reservation as the best account of the subject yet published.—G. M. DYSON.

* *Starch and its Derivatives.* By J. A. Radley, M.Sc., F.R.I.C. 3rd Edition (revised). Vol. 1. Pp. 510+xi. Chapman and Hall. Price 65s.

By-products and their Uses

A RECENTLY published report* is concerned with the findings of a survey team, appointed in 1948 by the Development Commission on the invitation of the Lord President's Office acting on behalf of a number of interested Departments, to undertake an enquiry into agricultural, forestry, and fishery products and wastes and their uses in the United Kingdom.

The subject of the better use of biological products and wastes is one to which much attention is being given in the U.S.A. and Canada, and while it was fully realised that conditions in the U.K. were very different, it was felt to be of importance to ascertain the extent of these products here and to consider whether fuller and better use could be made of them.

The report contains a great deal of information on the production and sources of supply of the main home and imported agricultural, forestry, and fishery products, on their main uses, and on the by-products derived from them. This information has been obtained partly by extracting statistical data from various published sources, including specialised Governmental reports, but largely by contact with individuals and organisations who are specialists in the various fields covered by the survey.

The information on the products and by-products is grouped in the report under the following headings:

1. Agricultural crops of the United Kingdom—grain crops, flax, linseed, mustard, hops, fodder roots, sugar beet, potatoes, vegetables, fruit, bracken, and peat.
2. Imported agricultural crops—vegetable oil-bearing materials, coffee and tea, cacao, cotton, jute and hemp, and tobacco.
3. Animal products—dairy products, meat, etc., leather, and wool.
4. Marine products—Fisheries, whaling and seaweed.
5. Industrial products and by-products of biological origin—brewing and distilling, starch manufacture, paper and board, gelatin and glue, antibrates, and sewage.
6. Timber and forest products.

The report, which also contains a review of the existing Government-aided and other research organisations in the United Kingdom, their primary functions, and the facilities which are at their disposal, forms a work of reference for data formerly available only from very scattered sources. It is hoped that on the basis of the essential facts which are presented in the report, the promotion of research into the better and fuller utilisation of the by-products may be stimulated and encouraged.

* *A Survey of Agricultural, Forestry, and Fishery Products in the United Kingdom and their Utilisation.* Pp. 141+vi. H.M.S.O. Price 7s. 6d.

The Leonard Hill Technical Group

Articles published in some of our associate journals in the Leonard Hill Technical Group this month include:

Manufacturing Chemist. — The Structure of Coenzyme A; Chemotherapy and Selective Toxicity, Part II.

Chemical & Process Engineering.—Recent Advances in Milk Processing Plant.

Abstracts from Recent Food Literature

Atmospheric Odours: Their Effect on Flavours of Stored Foods. A. Turk, P. J. Messer, and A. Blaskiewicz (*J. of Agric. and Food Chem.*, 1953, **1**, 79).—Food to be tested was stored with a variety of odour contamination sources, in rooms with and without air purification by activated carbon. Results showed that significant flavour adulterations of stored food might be caused by storage odours, and that such adulteration was preventable by suitable air purification.

Yeast: A Source of Biochemical Intermediates. L. Laufer, D. R. Schwarz, and E. D. Stewart (*J. of Agric. and Food Chem.*, 1953, **1**, 91).—Brief summaries are presented of the methods used for preparing nucleic acids, nucleotides, coenzymes, and other cell metabolites from yeast, and some potential applications in medicine and biochemistry are mentioned.

***p*-Hydroxybenzoic Acid Esters as Preservatives. I. Uses, Antibacterial and Antifungal Studies, Properties, and Determination.** T. R. Aalto, M. C. Firman, and N. E. Rigler (*J. of the American Pharm. Assn.*, 1953, **42**, 449).—The history of the esters of *p*-hydroxybenzoic acid and their uses as preservatives in pharmaceuticals, cosmetics, foods, and industrial products are discussed. The physical and chemical properties of the *p*-hydroxybenzoates are described, as well as methods of incorporation and a method of determination by ultra-violet absorption.

Antibiotic Activity of Seaweed Extracts. II. Rhodomela larix. H. G. Mautner, G. M. Gardner, and R. Pratt (*J. of the American Pharm. Assn.*, 1953, **42**, 294).—Describes experiments which suggest that the active fraction of the *Rhodomela* extracts may be a brominated phenolic compound.

A Comparison of Physical and Chemical Methods with Biological Assay of Vitamin A. T. K. Murray and J. A. Campbell (*The J. of Pharmacy and Pharmacology*, 1953, **5**, 596).—The results of vitamin A assays by existing physical and chemical methods are compared with each other and with the results of biological assays.

Particle Sizes for Additives to Animal Foods. C. Bloom and E. F. Livesey (*Man. Chem.*, 1953, **24**, 371).—Describes the construction of a mathematical model to calculate the particle size necessary to ensure even distribution at different levels of supplementation.

A Histological and Histochemical Study of Beef Dehydration. I. Rate of Dehydration and Structural Changes in Raw and Cooked Meat. H. Wang, F. Andrews, E. Rasch, D. M. Doty, and H. R. Kraybill (*Food Res.*, 1953, **18**, 351).—The results of preliminary experiments to determine some of the structural and chemical changes occurring when slices of raw and pre-cooked muscle tissue were dehydrated at elevated temperatures are presented.

Industrial Wastes. H. R. Murdock (*Ind. and Eng. Chem.*, 1953, **45**, 101A).—Land disposal of waste waters from food processing plants appears practical provided definite engineering conditions are recognised.

Natural and Synthetic Pepper-flavoured Substances. A. A. Newman (*Chem. Products*, 1953, **16**, 343).—The first of a series of articles on peppers and their different species and chemical composition. It deals with the two genera *Piper* and *Capsicum*, giving descriptions of plant habitat and various conditions of world growth. The chemistry of the active principles is dealt with briefly.

Estimating Vacuum in a Can. I. Shiga and K. Kimura (*The Canner*, 1953, **117**, 18).—A method for the estimation of the vacuum in a can without puncturing. This is achieved by means of the measurement of the diameter of a light disc that is produced by the reflection of light on the surface of the can cover centre disc.

Laboratory Preparation of Potato Granules by Solvent Extraction. E. G. Heisler, A. S. Hunter, C. F. Woodward, J. Siciliano, and R. H. Treadway (*Food Tech.*, 1953, **7**, 299).—A laboratory method for dehydrating mashed potatoes by extraction with organic liquids. The mashed potatoes are suspended three times in the liquid; the aqueous solvent is separated from the potato solids by filtration after each treatment. The final filter cake contains only about 5 per cent. moisture and is readily dried by mild heat.

Occurrence and Nature of Bacteria in Canned Beef. J. C. Ayres and A. T. Adams (*Food Tech.*, 1953, **7**, 318).—The determination of the incidence of total bacterial populations and spores in fresh and heat processed beef. Studies, using the methods described, are reported on fresh, canned, and heat processed beef. Results show a need for further study of the facultative aerobe in canned meats since a large number survived a 20 minute heating period at 80°C.

Meat Inspection and Slaughter Policy. C. Ash (*Municipal Eng.*, 1953, **130**, 1260).—A comprehensive review of the subject to date.

The Pathological Significance of Mottled Teeth. C. Dillon (*The Dental Practitioner*, 1953, **3**, 366).—The toxic effect of fluorine on the vital tissues of the dental pulp and associated osseous tissues are demonstrated, together with the long term effects of imbibing water containing toxic amounts of fluorine and the fact that, in general, the main tenets of the advocates of fluorination are unsound.

Amide Synthesis and Transamidation during Growth of Saccharomyces Cerevisiae. A. L. Sheffner and J. Grabow (*J. of Bact.*, 1953, **66**, 192).—*Saccharomyces cerevisiae* failed to grow on media containing ammonia, single amino acids, or mixtures of amino acids as the nitrogen sources in the absence of added Mg^{++}. Amide nitrogen to the extent of 2·5 per cent. of the total nitrogen could replace Mg^{++} for growth. Presumptive evidence was obtained for the presence of a growth factor in yeast hydrolysates which could replace partially the growth requirement for Mg^{++} or amide com-

pounds. Further results indicate that transamidation occurs readily during growth of *S. cerevisiae*.

The Use of Active Magnesia in Clarifying Cane Juices. C. B. Venton (*Bureau of Sugar Experiment Stations Tech. Comm.*, 1952, No. 1).—Initial tests of an exploratory nature were made by the author with "Elguanite," the lowest optimum addition for mixed juice being found to be 2·50 to 3·0 per cent. of the Brix. Filtration of the whole mixture proceeded with amazing speed with complete elimination of the suspended matter. Later, addition of dry MgO to cold juice gave a clarified juice slightly superior to that obtained with lime, but a poor effect resulted by adding the dry material to the hot juice. Mixtures of lime with magnesia were tried, but the results were not satisfactory. A factory trial with active magnesia alone is described.

Amino Acids and Proteins: Their Place in Human Nutrition Problems. N. W. Flodin (*J. of Agric. and Food Chem.*, 1953, **1**, 222).—Proteins differ in their nutritive value, or quality. The best are those which contain amino acids in approximately the same proportions in which they are utilised in the body. The protein problem in human nutrition is surveyed in this light, showing the value of high quality protein in preventing deficiency diseases, maintaining health of mother and child during pregnancy, preventing tissue wastage in old age, and in many other aspects of health. From the evidence, it is concluded that efficiency of protein utilisation may be improved by: (*a*) food combinations chosen for supplementary effects of their amino acid proportions; (*b*) even distribution of high quality protein among daily meals; (*c*) use of specific amino acid supplements to low quality proteins.

Amino Acids: Content of Sugar Beet Processing Juices. A. E. Goodban, J. B. Stark, and H. S. Owens (*J. of Agric. and Food Chem.*, 1953, **1**, 261).—The amino acids in sugar beets are included in the so-called "harmful" nitrogen that is a factor in the formation of molasses in the production of beet sugar. Their effect has been studied by paper chromatographic methods and as many as 18 were found in some samples of beet juice.

Coil and Calandria Vacuum Pans. C. G. M. Perk (*Proc. 26th Congress S. African Sugar Tech.*, 1952, 48).—A review of recent developments of coil pans in sugar manufacture.

Vitamins and Enzymes in Milk: Effect of Gamma Radiation on Activity. H. C. Kung, E. L. Gaden, and C. G. King (*J. of Agric. and Food Chem.*, 1953, **1**, 142).—Tests were undertaken to measure vitamin and enzyme retention in milk and related products coincident with irradiation from cobalt 60. Vitamin A, tocopherols, and ascorbic acid were highly sensitive to destruction within the time period required for sterilisation (at relatively low intensities). Carotenoids and riboflavin were moderately sensitive. The enzyme phosphatase, however, which is very sensitive to heat inactivation, was only slightly changed during identical exposures. Tests with milk and other dairy products demonstrated that irradiation at 80,000 roentgens per hour induced severe losses in nutritive quality before sterilisation was accomplished. Changes in enzyme activity, however, were sharply reversed in comparison with best effects on natural products. Protein denaturisation apparently can be avoided, relatively, while accomplishing this type of sterilisation.

Fruit Storage: Saturation of Activated Carbon used for Air Purification. A. Turk and A. Van Doren (*J. of Agric. and Food Chem.*, 1953, **1**, 145).—Qualitative and quantitative analyses of the sorbates of several carbons are presented, together with their variations through a fruit storage season.

Folic Acid in Fresh and Stored Eggs. R. J. Evans, J. A. Davidson, D. Bauer, and H. A. Butts (*J. of Agric. and Food Chem.*, 1953, **1**, 170).—The smaller amount of folic acid in stored eggs than in fresh eggs indicates that stored eggs not only do not look as good as fresh eggs, but they also have a lower nutritive value.

How to make Ripe Olives more Palatable. W. V. Cruess (*The Canner*, 1953, **117**, 11).—Smoking olives in the manner of kippered fish or bacon is said to give a pleasant aroma and flavour to the product. The method is described.

The Slough Experiment. (*The Lancet*, 1953, **264**, 1241).—A comprehensive scheme for the welfare of workers in industry.

An Explosive Outbreak of Food Poisoning caused by Salmonella Dublin. A. M. McCall (*The Lancet*, 1953, **264**, 1302).—The outbreak, affecting 610 known cases in Somerset in 1952, was T.T. raw milk supplied to schools and the public. When pasteurised milk was supplied the epidemic finished in a few days.

Better Potato Dehydrating by Slow Freezing. R. C. Hall (*Food Engg.*, 1953, **25**, 90).—It has been found that if cooked potatoes are frozen and thawed, it is possible to reduce the water content from about 80 to 60 per cent. by pressing. It is a preliminary process before dehydrating. Quick freezing results in minimum extraction on pressing. Very slow freezing releases almost 10 per cent. more moisture from the potato cells. An approximate equation is given:

$$Y = -5{\cdot}6 \log_{10} X + 71{\cdot}7$$

where Y = per cent. moisture in pressed potatoes (wet basis) and X = length of freezing time (in minutes).

Ascorbic Acid Retention in Frozen Concentrated and Canned Juices. E. E. Anderson, I. S. Fagerson, and C. R. Fellers (*Quick Frozen Foods*, 1953, **15**, 171).—Reduced ascorbic acid values of canned single strength juices and frozen concentrated juices are summarised. Some of the variation in vitamin C concentration in a given citrus juice can be attributed to the natural variation in the fresh fruit. The consumer can be reasonably certain that the processed citrus products now available, in the quantities normally used, bring the recommended daily quantity of vitamin C, *i.e.* 75 mg. The minimum requirements for adults and children are estimated at 30 and 20 mg. respectively (U.S. Food and Drug Administration).

The Evolution of a Publishing House

MR. LEONARD HILL'S REVIEW AT PORTRAIT PRESENTATION

Left: **Mr. W. Leonard Hill and Mr. T. Crosbie-Walsh after the unveiling of the portrait.** *Right:* **Some of the guests.**

Leonard Hill photographs.

His conception of the role of a technical and industrial publishing house "in this technologically exciting mid-twentieth century" was given by Mr. W. Leonard Hill, chairman of Leonard Hill Limited, at a party attended by advertisers, agents, authors, consultants and others, the occasion being to present him with his portrait in oils from the staff of the company.

Mr. T. Crosbie-Walsh, a director of the company and editor of FOOD MANUFACTURE, in handing the painting to Mr. Leonard Hill on behalf of the staff, said that it marked the recent acquisition and occupation of the new building, Stratford House, Eden Street, London. He paid tribute to Mr. Leonard Hill's outstanding achievements, not only in the field of technical publishing, but to his numerous extra-mural activities, directed to the development of British industry and trade in general.

Responding, Mr. Leonard Hill said that "the original development of the company was in chemistry and chemical engineering with the Chemical Engineering Catalogue, now CHEMICAL INDUSTRIES. The idea of this was put forward by Mr. E. E. Newitt, father of Prof. D. M. Newitt, F.R.S., who was editor of the publication for several years."

The company's first journal was FOOD MANUFACTURE, the first journal of its kind in the world. Then came MANUFACTURING CHEMIST. Although this was by no means the first chemical paper it was the first fine chemical and pharmaceutical paper, and thus impinged on no one else's field and did not constitute *merely* another competitor. MANUFACTURING CHEMIST, like FOOD MANUFACTURE, retained its solus position for many years. Then came PAINT MANUFACTURE. There was at that time no paper in any language in the field of surface coatings devoted exclusively to manufacture. Then followed PETROLEUM, the first journal in Europe to specialise in refining to the exclusion of drilling.

During the war, the company acquired BUILDING DIGEST, POTTERY AND GLASS, and MUCK SHIFTER, the latter being the old English name for the public works contractor.

After the war the company returned to its original theme of chemistry and engineering with FIBRES, WORLD CROPS, DAIRYMAN, ATOMICS, and CHEMICAL AND PROCESS ENGINEERING.

The company's publications now cover industries ranging from agriculture, the oldest in the world, to atomics, the newest.

Continuing, Mr. Hill said that in this country, and indeed all over the world, there was a definite need for increasing knowledge and use of chemical engineering, the principles of which were applicable to a great number of industries. Recognising this need, the company had proceeded to stimulate and develop chemical engineering through CHEMICAL AND PROCESS ENGINEERING. This journal was increasing in size and influence year by year and more and more chemical engineers of high standing were contributing to it. The steady increase in its advertising pages showed how chemical plant manufacturers recognised this influence.

Atomic energy was obviously destined to exert a tremendous influence on humanity, in both its military and its industrial aspects. The company was interested only in its industrial aspects, and in 1950 ATOMICS, the first journal in Europe to deal with nuclear energy in industry, was launched.

There was a very active development of man-made fibres, such as nylon, Ardil, and Terylene, as well as new techniques in the preparation of natural fibres. Here again was a new field and Leonard Hill Limited had entered it with FIBRES.

Since the war there had been an ever increasing interest by governments in their domestic agriculture, as well as in the development of the less productive areas of the world. A huge army of specialists, advisers, soil chemists, and pest control specialists, associated with the universities, were working in collaboration with the research and plant-breeding stations. Added to these were the agricultural research councils, and the agricultural advisory services which were perhaps better known in this country as the county agricultural committees. These workers were duplicated in every country of the world. They had already raised farming to new standards and increased productivity to an extent that would have been incredible a decade or two ago. These practical scientists with common interests throughout the world, working closely hand-in-glove around the world, had no paper devoted to their highly important activities, until the company produced WORLD CROPS covering the fields described. This paper had taken its place as one of the great international successes.

After the applause that greeted Mr. Hill's remarks had subsided, Dr. L. A. Jordan, Director of the Paint

(*Concluded on page* 455)

News from the Industry

FORTHCOMING EVENTS

British Institute of Management

The Annual Conference of the British Institute of Management is to be held at Harrogate from November 11 to 14.

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Society of Public Analysts

A meeting for the reading of original papers will be held by the Society of Public Analysts and Other Analytical Chemists at the meeting room of the Chemical Society on November 4 at 7 p.m.

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The Institute of Refrigeration

A joint meeting with the Low Temperature Group of the Physical Society has been arranged by the Institute of Refrigeration as follows:

Nov. 17. "Freeze Drying," by Dr. R. A. Kekwick and Dr. R. F. Strickland-Constable.

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The Chemical Society

The two meetings to be held in November by the Chemical Society are as follows:

Nov. 5. Tilden Lecture, "Aromatic Character in Seven-membered Ring Systems," by Dr. A. W. Johnson, at the Lecture Theatre, Imperial College of Science and Technology.

Nov. 19. Centenary Lecture, "Some Applications of the Separation of Large Molecules and Colloidal Particles," by Prof. A. Tiselius, at the Lecture Theatre, The Institution of Civil Engineers.

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The Royal Institute of Chemistry

Among the meetings arranged for the London Section of the Royal Institute of Chemistry are:

Nov. 18. Annual General Meeting to be held at King's College Lecture Theatre, followed by a talk by Dr. H. J. T. Ellingham entitled "Prospect."

Nov. 19. "Some Recent Advances in Fluoride Analysis," by Dr. B. J. MacNulty, to be held at the Medway Technical College, Gillingham.

Nov. 25. "Corrosion in Action," by E. J. Vaughan (films and exhibits), to be held at the Dartford Technical College.

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Society of Chemical Industry

November meetings arranged for the Food Group of the Society of Chemical Industry are:

Nov. 2. "Recent Advances in Gelatin Research," by Mr. A. G. Ward. A joint meeting with the London Section.

Nov. 13. Conversazione. A joint meeting with the Agriculture Group, to be held at the Borough Polytechnic, London.

Nov. 25. "Metal Containers for Food," by Mr. J. G. Huntley. Afternoon visit to Ebbw Vale. A joint meeting with the South Wales and Bristol Sections.

There will be a joint meeting of the Agriculture Group and the Crop Protection Panel as follows:

Nov. 17. Afternoon and evening symposium. "Grassland Management" and "The Treatment of Turf."

The following meeting has been arranged for the London Section for November:

Nov. 27. "Writing Wrongs," by A. L. Bacharach, to be held at the London School of Hygiene and Tropical Medicine.

The Microbiology Group have arranged the following meeting for November:

Nov. 12. "The Microbiology of Different Types of Cheese," by Dr. J. G. Davis, to be held at the Medical Society of London.

Apprentice Scheme for Baking Industry

Members of the trade Press, apprentices, students, council members, and other guests were recently entertained by the National Joint Apprenticeship Council for the Baking Industry at a reception and Press conference at the Trocadero Restaurant.

In his address, Mr. E. F. Mitchell, who at the Annual General Meeting had been unanimously elected once more as the Independent Chairman, said that at the end of the first two years of the Apprenticeship Scheme it could be safely said that the problems attached to the initial period had been overcome and the scheme had already done much to enhance the prestige of the industry, all sections of which had joined to implement it.

Help had been freely given by the Ministers of Labour and Education, and no fewer than 20 Local Councils were in operation in different parts of the country.

Mr. Mitchell stressed the obvious advantages of the National Joint Scheme, particularly its effect upon recruitment to the industry, but he was of the opinion that the organised training that apprenticeship provided should start on the day a young school leaver entered the bakery.

It was encouraging to note that the scheme had meant that more young people were receiving part-time day release instruction and several apprentices had entered for the recent competitive scholarship examinations.

During the discussion that followed, the advantages of the Apprenticeship Scheme were emphasised and, except for a few minor criticisms, it received the approval of those present.

OBITUARY

Mr. Francis Patrick Irwin Crossley, director of Crossley Bros. Ltd., on August 26.

*

Mr. George Edward Brown, managing director of Rees and Co., pickle manufacturers, Gillingham, Kent, on September 3, at the age of 83 years. He was a former President of the Medway Chamber of Commerce, of the South-Eastern Wholesale Confectioners' Association, and an honorary life member of the British Federation of Wholesale Confectioners.

Insect Proofing of Ships

A single treatment of a ship with a new insecticidal resin (covered by patent applications belonging to the National Research Development Corporation) will clear completely the heaviest cockroach infestation and will also protect the ship against all re-infestation for one to two years. These are the findings after practical trials on ships carried out by Insecta Laboratories in co-operation with the Port of London Health Authority during the past two years. The same treatment is equally effective against bed bugs, flies, mosquitoes, and other insect pests.

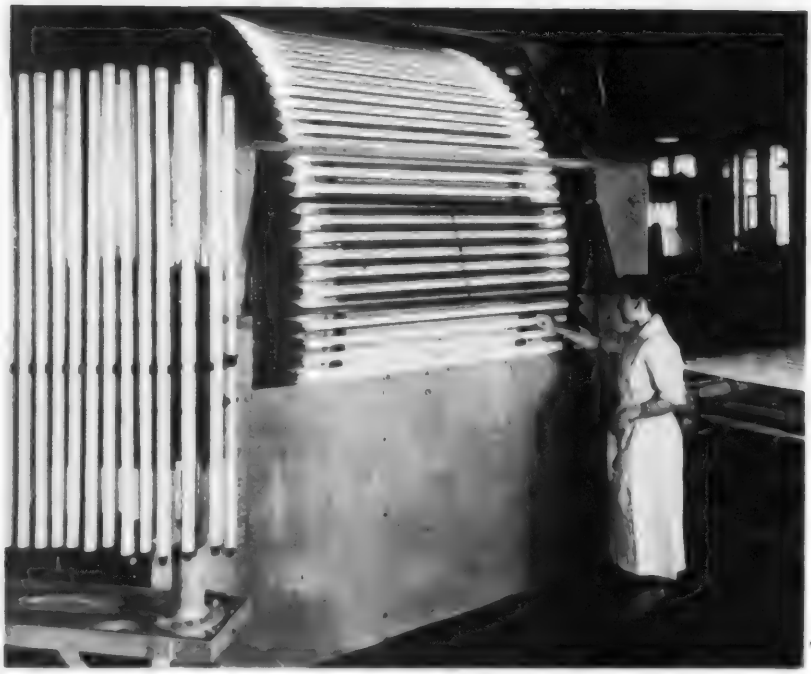
By incorporating a highly active insecticide, such as Dieldrin, in a urea formaldehyde resin, it was found that the normal life of the insecticide could be considerably prolonged. Such resin coatings have remained in an intensely active state for more than two years.

In this type of formulation, the insecticide is present as a supersaturated solid solution within the resin vehicle. From this solid reservoir a bloom of micro-crystals is precipitated on to the surface. The minute crystals, which are less than ten microns in length, are much more toxic to insects than the larger crystals deposited by ordinary insecticide sprays.

If the surface bloom is removed by scrubbing or washing, a fresh crop of micro-crystals is deposited on the surface from the reservoir below. The insecticidal coating thus regenerates itself and will continue to do so for one, two, or more years, even when continually removed at weekly intervals by scrubbing.

The regenerated surfaces show no diminution in insecticidal action but remain at maximum efficiency throughout their life.

In view of the fact that a single treatment with the new insecticidal resin is so lasting in its effects, the overall cost of insect elimination by the new treatment is less than for any other method of control.



One of the new automatic stabilising machines installed at the Osram Lamp Works at Shaw. The use of this machine ensures that the electrical characteristics of all mains-operated fluorescent tubes are uniform when they reach the user.

Improvements in Fluorescent Lighting

Considerable improvements in reliability and efficiency of Osram fluorescent tubes, resulting from new techniques and manufacturing methods, have been announced by the General Electric Company, who recently invited members of the Press to visit their research laboratories at Wembley.

On arrival at the laboratories, the guests were welcomed by the Director of the Wembley laboratories, Mr. A. W. Humphries, B.Sc., F.Inst.P., M.I.E.E., who outlined the work of the particular departments that would be visited and explained that only a very small part of the G.E.C. research organisation, which employs 2,500 people, could be seen in the course of the visit. Stressing the importance of recent developments concerning fluorescent powder for the production of the new improved tubes, Mr. Humphries explained that the three chief contributions of research in this respect concerned finding the best formula for, and the correct structure of, the fluorescent powder, finding the best way to deposit the powder on, and to make it adhere permanently to, the inner surface of the tube, and finding a design of cathode to produce the best life performance.

The visitors were conducted round the laboratories to see the many varied tests being carried out, and also inspected working demonstrations of the various pieces of equipment and scientific instruments necessary for the development of the new production techniques.

The results of these researches have been put into practice at the company's works at Shaw, near Manchester, where the fluorescent tubes are manufactured; these works have recently been re-equipped with modern machinery to enable the new techniques to be employed. New advances in precision mass-production techniques, developed by the works engineers themselves, include accurate control of cathode production, fixing, and coating; a new design of automatic vacuum pumping machine and of automatic stabilising machines; and the use of statistical methods as a guide to technical and economic control of processes.

Following the tour of the laboratories, and before being entertained to lunch at the Rest Hotel, Kenton, the visitors reassembled to see a short film of some of the equipment now being used at the Shaw works. Diagrams and models were used to illustrate how the researches have resulted in greater efficiency and accuracy in some of the manufacturing processes which, in turn, have contributed to an increased rate of production and improvement of performance. The overall results of this research work and its application have produced a marked improvement in output per employee, a progressive decline in the cost of Osram fluorescent lamps, long life and freedom from early defects, and in particular, an increased light output of 12½ per cent. from the Osram tubes used chiefly in industry, the 5 ft. 80 watt "Daylight" and "Warm White," for the same amount of electricity consumed.

Vinegar Storage Vats

The largest vinegar vats in the world are in use at a bulk vinegar brewery at Stourport, Worcestershire. Standing 23 ft. high with a circumference of 120 ft. and a capacity of 140,000 gallons, they are made of Siberian redwood and pitchpine, and were designed by the late manager of the vinegar brewery.

The vinegar matures in the vats for eight months or more. Much of it is then exported to the colonies; other markets include Germany, where, mainly as an ingredient of Worcester sauce, it is becoming increasingly popular.

The vinegar also forms part of the company's best selling export to America — cocktail onions coloured red, yellow, green, and blue.

Devonshire Cream in Tubes

The supplying of Devonshire cream in plastic tubes has been adopted by a dairy firm at Modbury, South Devon. The idea of selling cream in this particular type of packing attracted so much attention in the dairy world, and has proved so successful, that the company has decided to sell milk in the same manner.

Mr. W. I. L. Lang, managing director of the firm, points out that milk is being sold in that way in Switzerland, the containers used having a self-sealing valve on one side which allows the user to pour out the amount of milk required, the valve once again sealing the container. The milk can also be drunk through straws placed in the nozzle.

It was last year that Mr. Lang first started the packing and selling of Devonshire cream in tubes, and his firm now packs over five gross three fluid ounce tubes every day, distributing them to all parts of the country. When the requisite permits for exporting the cream are obtained, Mr. Lang, who has already been sending it to Canada and the United States, believes that markets will be found for the product all over the world.

It is claimed that while it is in the tube the cream possesses excellent keeping properties but can be deep frozen if desired. The firm started by using metal tubes, but has now introduced a new plastic type which meets all the requirements.

The cost of distributing cream in this way is much cheaper: two dozen tubes can be sent for 1s. 10d., whereas it costs 2s. to send 12 jars.

A New White Flour

A new high quality white flour, in both self-raising and plain form, is being marketed by Weetabix. The flour, which is being manufactured without agene, is to be marketed at 2s. for the 3 lb. bag and 8½d. for the 1 lb. size.

Stainless Steel Fittings

A range of stainless steel pipe fittings for the food and allied trades, made to the I.A.M.D. or the B.S.S. 1864 standards, was shown by the Realm Engineering Works at the 6th London Regional Display of the Engineering Industries Association held from October 13 to 15.

Cold Store for Ice Cream

The ice cream cold store completed at Wall's Acton factory will hold nearly 1,000 tons of ice cream; it is so highly mechanised that its operation requires a staff of only about 20 men.

The three-storied building is built on stilts to prevent "frost heave"; had it been built directly on the ground, the cold would have eventually penetrated the insulation and formed ice in the earth itself. In time, this frozen earth would have lifted the building and damaged the foundations.

In the despatch yard, to which power-driven conveyor belts bring out the ice cream for loading into waiting vans, is a small cabin in which is seated a controller operating batteries of electric buttons to start or stop the conveyor belts. By means of a microphone and loudspeakers, he can give orders to, or receive messages from, staff in every part of the vast store. Microphones at strategic points enable the porters to call up the controller to warn him of any hold-up or notify him when they are ready to send down ice cream to the despatch yard. Similarly, the loading staff on each floor can control the movement of their own section of the conveyor systems.

Six powered, wooden-slat conveyors take the various ice cream lines into the cold store. The first two deliver vanilla brickettes and strawberry-and-vanilla bumper bars to the top floor; the third pair conveys vanilla Family Bricks, bulk ice cream in one-gallon cans, and miscellaneous, flavoured lines, including three-flavoured Neapolitan ice cream, to the first floor.

Chain-link conveyors are used on the three floors and, altogether there is more than half a mile of conveyor throughout the cold store.

The ice cream lines, loaded by porters, are taken out to the other end of the cold store by a set of seven conveyors—two from each floor, and one extra reversible conveyor for gallon-bulk ice cream and special lines. All the conveyors converge in an air-lock before finally leaving the cold store. Four vans can be loaded simultaneously. Speed in loading is essential in handling ice cream and many of the company's vans have roller-conveyors built into their floors so that cans may roll right into the insulated compartment.

In the despatch yard there is an arrangement by which the seventh conveyor can be reversed to take returned ice cream back to cold store.

Quick Frozen Peas Sales Campaign

As a result of the excellent growing conditions which have prevailed throughout this summer, and the opening of a further factory at Kirkby, near Liverpool, Birds Eye have available this year their biggest production of quick frozen peas. In order to promote larger sales of this product in particular, in addition to some of their other lines, Mr. W. Mitchell, the company's sales director, has planned one of the most extensive sales campaigns yet undertaken for quick frozen foods.

Lagging Adhesive

A lagging adhesive that has been successfully used in America for over 10 years is now being made in England by The Arabol Manufacturing Co.

This product was first produced in America during the last war to meet certain shipbuilding specifications, and is now used in factories, office and residential blocks, hotels, hospitals, and similar buildings as well as on naval and merchant marine ships and dockyard installations.

It is one of the latest types of synthetic resin adhesive cements, and many outstanding advantages are claimed for it. It is used for securing the covering on fibreglass, asbestos, magnesia, and other types of insulation on pipes, boilers, and ducts for hot and cold water and steam lines.

The adhesive resists high and low temperatures, withstands immersion, and dries with a clean white finish that makes painting unnecessary. It is claimed to be vermin proof, and is suitable for outdoor as well as indoor installations and has been used for under-water lagging.

Re-lighting a Grocery Shop

High quality colour rendering and economical lighting are provided in a grocery shop belonging to the Annfield Plain Co-operative Society at Langley Park, near Durham.

Planned by BTH lighting engineers to replace an installation of tungsten filament lamps in open reflectors, the scheme consists of eight Mazda tungsten ballast lamp fittings, suspended by single conduits from the existing lighting outlets at 10 ft. from floor level.

Each fitting houses two Mazda 4 ft. colour matching fluorescent lamps together with two Mazda tungsten ballast lamps which replace the chokes normally needed in a conventional fluorescent lighting circuit.

The overall efficiency of the unit is above 22 lumens per watt as compared with the efficiency of about 11 lumens per watt of the original 100 watt tungsten filament lamps.

The single 100-watt filament lamps of the original installation were suspended in reflector fittings at a height of 9 ft. and gave varying illuminations of up to 8 lumens per sq. ft. on the working plane. The new installation provides an even illumination of 18 lumens per sq. ft.

Decontrol of Starch and Glucose

Decontrol of starch and glucose after nearly 14 years will mean higher quality for the consumer and an improved distributive service to the trade.

Mr. C. L. Clarke, sales director of Brown and Polson, the largest manufacturers, distributors, and importers of maize, starch, and glucose in the United Kingdom, commenting on the decontrol which came into force on September 27, stated that freedom from Government restriction would give the industry the opportunity to develop new fields of use for both commodities.

"We welcome this decontrol which will mean higher quality for the consumer and a better service to the trade," Mr. Clarke stated, "and our research laboratories are developing new uses for starch which, thanks to the new freedom, we shall now be able to present to industry and home consumers."

The Brown and Polson group of companies manufacture 200,000 tons of starch products a year—400 different products bought by more than 80 different industries.

The new lighting at the grocery shop of the Annfield Plain Co-operative Society.

The new Geo. W. King factory at Stevenage.

Farm and Mechanical Handling Plant

The last stage of a move, which has brought the whole of their extensive works and offices together on one site at Stevenage, has now been completed by Geo W. King.

On a 30-acre site, a modern factory is now producing equipment of all kinds for industry and agriculture—from automatic waterbowls to pneumatic grain conveyors, from rope hoists to giant travelling cranes.

Storage and Delivery Service

Developments in the storage and delivery service maintained by S. E. Thomas and Son have made necessary the building of extensions to their premises at Aylesford, near Maidstone, where about 80,000 cu. ft. of storage and garage space are now available.

Operating with one truck in 1931, the company have steadily progressed during the past 22 years, and now run a fleet of 14 vehicles, a considerable number of which are engaged on delivery work. They are at present restricted to a 25 mile radius, except where they obtain permits for certain commodities, but with the advent of the 1953 Transport Act this restriction will be removed, resulting in a considerable increase in traffic.

The method which is usually adopted and found most satisfactory is to hold a bulk stock of the various goods to be delivered throughout Kent, and upon receipt of instructions, the goods are loaded and despatched. By following this method, the goods often reach their destination within two days of the taking of an order by a firm's representative. The compactness of the concern and its operation under personal supervision ensure that losses and damage are almost completely eliminated.

C. W. Banks—Veteran Tennis Champion

For the second year in succession, Mr. C. W. Banks, chairman and managing director of British Fish Canners, Dundee and Leeds, in partnership with Mr. T. A. Heron, has won the All England Veterans' Doubles Lawn Tennis Championship at Eastbourne.

Food Technology Courses

Several special courses have been arranged by the Food Technology Division of the Borough Polytechnic.

One of these under the heading "An Outline of Human Nutrition" will comprise a course of 22 special lecture-demonstrations given by D. S. Papworth, M.Sc., A.R.I.C. These started on Wednesday, October 7, and will continue every Wednesday until December 16 and then from January 13 to March 24.

A course of 10 lectures on "Mineral Requirements," which started on Monday, October 5, is to continue every Monday until December 7. The lectures will deal with calcium and phosphorus, iron, sodium and potassium, iodine, fluorine, trace elements, and a general survey.

Food biochemistry is the subject of a further course in four sections: I. The Fats and Related Compounds; II. The Sugars and Related Compounds. Both these sections commenced on Tuesday, October 6, and are to run weekly until December 15 and then from January 12 to March 23. Section III.—Laboratory Course on Fats and Related Substances will consist of 11 classes on Thursdays from October 8 to December 17. A further laboratory course on Sugars and Related Substances (Section IV) will be given from January to March, 1954.

Two sections have been arranged under the heading "Microbiology." Section I — Introductory — has been arranged for Tuesdays from October 6 to December 15 and from January 12 to March 23; Section II—Advanced—has been arranged for Mondays from October 5 to December 14 and from January 11 to March 22. Late registrations can be accepted for any of these courses.

From Ruislip to London, W.1.

Following the recent move of their head office and sales department from Ruislip to the West End of London, Anthony Hoists, manufacturers of tipping gears, all steel truck bodies, and tailboard loaders, entertained some of their many friends at three separate receptions from September 15 onwards in their new suite of offices at 170, Piccadilly, London, W.1.

ERECTIONS AND EXTENSIONS

A scheme to convert premises at Cleveland Road, Bournemouth, into a bakery is planned by Parkstone and Bournemouth Co-operative Society.

■

Plans have been approved for Sayers Ltd. to carry out extensions to their bakery at Larenzo Drive, Liverpool.

■

Permission to construct a new factory on a site at Penfilia Road, Bryhyfryd, is being sought by F. Holt and Sons Ltd., confectionery manufacturers, of Swansea.

■

Plans have been drawn up by Daintee Chocolate Confectionery Co. to carry out extensions to their factory in Clifton Road, Blackpool.

■

Extensions now being carried out at Wall's bacon factory at Willesden are expected to increase the factory's curing capacity by more than 40 per cent.

These extensions, the first to be made at the factory since its opening in 1935, include new curing rooms, increased maturing space, and a new baling room.

At present, the factory has a slaughtering capacity of 1,000 pigs per day. A proportion of these animals go to the adjacent sausage and pie factory, the remainder for bacon production.

Visking Sausage Casings

A new British industry will be established by a company called Viskase Limited, formed for the purpose of distributing and manufacturing "Visking" cellulose and fibrous casings for sausages, cooked meats, and other meat products. Associated in the new venture are Sponcel Limited of Bromley (Kent), and Swansea, and The Visking Corporation of Chicago, U.S.A.

Sponcel Ltd. are manufacturers of Spontex sponges and are connected with The Viscose Development Company Ltd., producers of Viscose products for half a century. The Visking Corporation was the first to produce a cellulose casing on a commercially practicable basis and are the largest and most successful in this field.

Visking casings provide modern merchandising methods for sausages and other meat products. Printed casings in a multitude of brilliant colours permit the identification of the various products by brand name or trade mark, thus establishing permanent markets for first quality goods. Other advantages are improved production methods, lower production costs, lower retail prices, and better display.

A factory is in course of equipment at Swansea and will be ready for operation at the beginning of next year.

Seen at the Dairy Show

Pictorial exhibits illustrating their latest ice cream hardening tunnels and large scale lollipop freezers were displayed by the S.B. Engineering Co.

■

New exhibits on the G.E.C. Stand included two infra-red heating units for pigs, poultry, and other farm stock.

Also exhibited were two Genalex farm food cookers, a range of electric dairy equipment comprising storage and hotblock steam raisers, a 27 cu. ft. hotblock sterilising chest, water heaters of various sizes, and grain drying equipment.

■

A full range of Prestcold refrigeration equipment was shown, including chilled water milk cooler in full operation, dairy cold room, 150 cu. ft. capacity, in full operation, churn immersion cooler, with churn guide ring and lifting hoist, frozen food and ice cream conservators, service cabinet, open type frozen food cabinet, open display counter, closed display counter, and fish cabinet.

■

Models from the range of refrigerating compressors, including a 16-cylinder version, were shown by York Shipley; a six-cylinder model was also shown.

Another interesting exhibit was the new unit cooler, developed for both milk storage rooms and low-temperature duties. In the latter case, the coolers are equipped with a simple water-defrosting device.

Other exhibits included a twin-cylinder vertical single-acting ammonia compressor, two of the larger models of Freon-12 water-cooled units, and two small air-cooled machines.

■

The display of equipment on the A.P.V. stand indicated considerable activity in their design and research departments.

A development of outstanding importance to the buttermaking industry is the new cream treatment unit, which is proving a very economical and successful plant for pasteurising and removing foreign flavours. A number of plants have now been installed in New Zealand and on the Continent.

An arrangement has been reached for the manufacture in this country of the American Manton Gaulin homogeniser and an example of this equipment was shown on the company's stand for the first time.

In addition there were displays of stainless steel pipe fittings and of storage tanks with standardised components. Examples were also shown of the range of general purpose process vats which the company is producing and of a measuring can filler and large capacity Duplex milk filter.

A three-cylinder Kombinator (system Schröder) suitable for the production of margarine, edible fats, and similar products from liquid form to a continuous extrusion in semi-solid form, was exhibited by Frederick C. Kane.

Also on view was a working model of a KANEpack cartoning machine; this receives individually wrapped packages and stacks them in rows and layers into cartons which, when filled, are automatically ejected.

Other exhibits comprised two small filling machines capable of filling 1,200 containers suitable for jam, cream, and similar semi-solid products and a 50 gallon per hour homogeniser which can also be used as a pressure feed pump; in the latter case the homogenisation valves would be excluded.

■

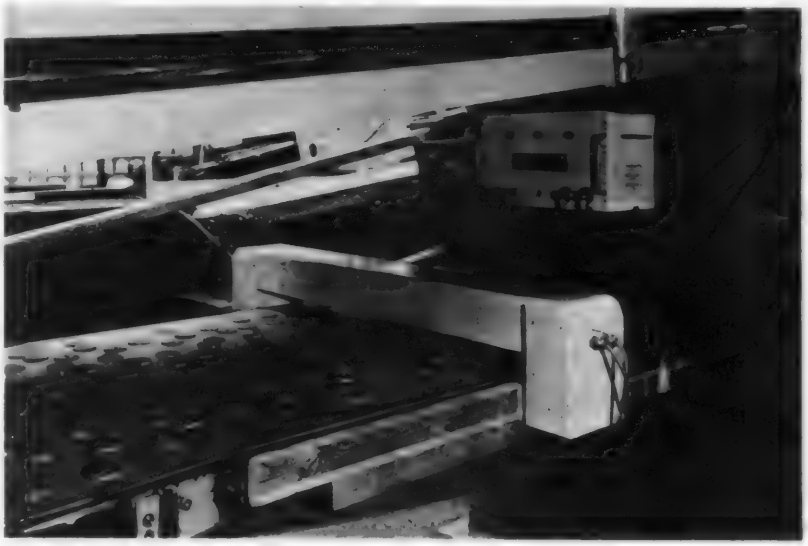
Four refrigeration compressors and two homogenisers were shown by G. and J. Weir.

The 9 in.×6 in.×6 in. ammonia compressor is a compound machine for use where the compression ratio would be excessive for a single-stage type. This machine offers a saving in power because of the lower compression in the individual stages. The applications of this machine include ice cream and other types of hardening tunnels, quick freezing plants, etc.

Other exhibits were a 7 in.× 7 in. single-acting ammonia compressor, and air cooled, self-contained condensing units, in which the compressor, condenser, and driving motor are all compactly mounted on the bedplate. These units use methyl chloride or Freon as refrigerants.

The homogeniser shown was of the standard size, with a capacity of 100 to 200 gallons an hour. This model is driven by a vertical motor through worm gearing, the motor being mounted directly on the pump framing. It has a single-stage homogenising valve. The smaller capacity machines were represented by an homogeniser with a capacity of 10 gallons an hour, driven by a separate motor through a V-belt drive. The standard range of homogenisers covers all capacities between 10 and 1,250 gallons an hour.

A selection of homogenising valves of the conical, serrated, and insert types was also exhibited, together with a suction and discharge valve assembly.



A metal detector installed by Kearley and Tonge.

Metal Detection

The presence in food products of small particles of ferrous and non-ferrous metals can be traced by the use of the Goring Kerr metal detector. In the standard model, consisting of an electronic control unit and a search head, the latter can be constructed to individual requirements, its dimensions being governed by the width of the belt or chute around which it is installed and the height of the product under examination.

Any metal in the product on the belt is immediately detected upon passage through the search head; a red light glows on the control unit and, if desired, an alarm may be given and the belt automatically stopped.

The company has also evolved another model, primarily for application to extruded and other products where a small aperture search head with high sensitivity is required.

Change of Address

The new London office of G. and J. Weir is at Dunster House, 37, Mincing Lane, E.C.3.

The telephone number, Mansion House 1985, remains unchanged and the telegraphic address is "Hydrokineter, Fen, London."

Scottish Raspberries for U.S.A. and Canada

GOOD PROSPECTS FOR QUALITY PACK

Raspberries packed into 2 lb. chip baskets are transported to the factory where the fruit is graded before packing into drums.

In 1952, Mr. S. W. Smedley made enquiries into the possibilities of exporting frozen raspberries from Scotland to America and Canada, as a result of which a shipment, amounting to about 250 tons, was sent from Glasgow. Their favourable reception in America made it obvious that further shipments would be welcomed if better methods of packaging could be devised.

In the early part of this year, Mr. G. P. Smedley, of Smedley's Dundee factory, visited America in order to assess the possibilities of increasing exports of frozen raspberries and to ascertain the type of package that would be most acceptable to the U.S. trade. The containers which appeared to meet with all the requirements were 5 gal. steel drums, lacquered inside and painted outside, although the company had to ship a certain amount in 150 lb. wooden kegs as there were not sufficient steel drums available to hold the quantity of berries in the time required.

Almost 1,000 tons of frozen raspberries (variety Malling Promise) were exported to America this year, an amount which could have been doubled had the Scottish growers been in a position to supply. Owing to the bad weather in the early part of the season, however, many of the raspberries went mouldy, and this season's crop has been one of the worst for many years.

The raspberries were packed into 2 lb. chip baskets and conveyed to the factory where the fruit was graded as it passed along conveyor belts. It was then filled into the drums and despatched for freezing to one of the company's two freezing plants at Dundee and Blairgowrie. On board ship, the berries were kept in refrigerated holds and on arrival at New York put into cold storage until required.

The bulk of the berries exported this season have been grown on the company's Scottish farms, the total area cropped being about 1,000 acres. In view of the likelihood of increased demands from overseas, it is intended to increase the present acreage of raspberries.

The drums of frozen raspberries are held in the cold store pending despatch to New York.

Essence of Caramel Flavour

Intended for use primarily as a flavouring agent, Carameleff, made by George Clark and Son, can also be used for colouring, particularly in those products which originally and traditionally were coloured and flavoured with sugar burnt "on the spot" in a metal spoon, such as caramel flavoured desserts.

This new product, which is being distributed by G. Havinden Ltd., can be used commercially in desserts, ice cream, sugar confectionery, flour confectionery, icings, biscuits, and all products with a caramel flavour.

Fish Meal and Oil Plant

A full range of the equipment required for the production of meals and oils from fish, fish offal, and marine animals is manufactured by Rose Downs and Thompson. A typical installation is capable of treating 100 long tons of raw whole white fish, or 250 tons of raw whole oily fish per day of 24 hours. It includes all the necessary equipment for continuous handling, feeding, reducing, cooking, pressing, drying, cooling, meal finishing, and liquor treatment for oil recovery.

The company's service includes the design, manufacture, erection, and putting into operation of complete fish plants for a wide range of capacities. Plants can be designed to include provision for future expansion and future adaptation from atmospheric to vacuum working, which is greatly facilitated by the use of special unit construction equipment.

Export Firm's Centenary

To commemorate the centenary of the foundation of the firm of Gordon and Gotch, the company has published an illustrated history of the growth of the company from its origin in Melbourne in 1853 to the present day.

In the past century, two great commercial enterprises, on opposite sides of the world, have grown from the small market stall in Melbourne. The company, which today operates a group of diverse commercial enterprises, some of which have sprung from the original trade in magazines and books, ships each year well over 12,000 freight tons of a wide range of commodities from the Port of London alone.

Millions of rolls of self-adhesive cellulose tape are despatched weekly by the company; the Sellotape Stationery Division acts as sole distributors to the stationery trade in the United Kingdom, while the Industrial Sellotape Division supplies thousands of British manufacturers and packers with their sealing, labelling, and identification needs.

The entire organisation is backed by its service departments, secretarial, accountancy, invoicing, addressograph, and public relations.

APPOINTMENTS AND RETIREMENTS

Mr. William B. Cormack, managing director of H. J. Heinz Co., Ltd., has been appointed a director of H. J. Heinz Company of Pittsburgh, Pennsylvania.

■

Mr. F. N. Shepherd, retiring resident director at Wall's Godley factory, was presented by Mr. Amos A. Taylor, on behalf of all the Godley employees, with two cabin trunks, an electric coffee set, and a cocktail set.

■

Following the death of Mr. A. M. Sommerville, A.I.P.A., chairman and managing director of Sommerville and Milne, Miss N. E. Harris, A.I.P.A., has been appointed managing director.

Mr. C. H. Chalmers.

Mr. B. J. Barnes.

Mr. B. J. Barnes has been appointed representative of W. J. Bush and Co. for the confectionery and food trades for the London area. Mr. Barnes has been with the company for 28 years. He was representative for the South Coast area before the war and afterwards became manager of the Eire Department and has recently been the representative for Scandinavian countries.

Mr. C. H. Chalmers has been appointed the company's representative for the South Coast of England area. Mr. Chalmers has been with the company for 10 years and has been employed in the Sales Department.

■

The Lord President of the Council has appointed Mr. W. L. Heywood, O.B.E., to be a member of the Advisory Council for Scientific and Industrial Research from October 1, 1953.

Mr. Heywood, who is General Secretary of the National Union of Dyers, Bleachers, and Textile Workers, is also Secretary of the National Association of Unions in Textile Trades.

Mr. E. Fletcher retired from the Advisory Council on September 30 on completion of his period of membership.

■

The following changes in the membership of the Council and Executive Committee of the Aluminium Development Association have been announced.

Council.—Mr. H. E. Jackson has resigned, following his retirement from the Board of Imperial Chemical Industries Ltd. (Metals Division). His place has been taken by Dr. Maurice Cook.

Mr. G. A. Woodruff resigned on retiring from J. Stone and Co. He represented L.M.F.A. Development Ltd. on the Council and his place has been taken by Mr. J. F. Paige of William Mills Ltd.

Mr. C. W. Cumber, representing Richard Thomas and Baldwins, has resigned on taking up an overseas appointment with his company; his successor has yet to be appointed.

Executive Committee.—Following the appointment of Dr. Maurice Cook to the Council, he has been succeeded by Dr. N. P. Inglis.

Mr. F. G. Woollard has resigned, following his retirement from the Birmid Group, and his place has been taken by Mr. Harold Goodwin of Birmetals Ltd.

Mr. F. R. C. Smith has also resigned. Mr. J. H. Mayes of Northern Aluminium Co. Ltd. has been appointed in his place.

■

Mr. A. C. H. Cairns, B.A., B.Sc., A.R.I.C., has been appointed to the Board of Joseph Crosfield and Sons and William Gossage and Sons from October 1, 1953.

■

Mr. G. A. Cooke, M.A., who has been manager of the company's Metallic Soap Department for the last seven years, has been appointed a director of Norman Evans and Rais.

■

Mr. J. Arnold Fox has been appointed chairman of Price's (Bromborough), an associated company of Unilever.

Joseph Crosfield and Sons Limited and William Gossage and Sons announce that they have agreed to release Mr. Fox to take up his new appointment. He resigned his directorships of these companies, as well as of Industrial Soaps Limited (of which company he is at present chairman) on September 30, 1953.

Fire Destroys Correspondence

The major part of the mail delivered to Gale and Mount between September 18 and 20 was destroyed by fire and the company requests that anyone who has not received a reply to communications sent on the dates mentioned should repeat their letters.

Training in the Baking Industry

A new and well-equipped bakery has been opened at the Lauder Technical College, Dunfermline, Fife, to allow expansion of bakery industry training. It takes the place of the Dunfermline Co-operative Society bakery which for years has been at the disposal of local students.

Collapsible Tubes

Collapsible tube manufacturers have been working for some years towards the specification of accurate dimensions for tubes, and a British Standard has now been issued for the dimensions of collapsible tubes with short screwed nozzles. It will relate to tubes for a wide range of pastes and semi-liquid materials, such as medical and toilet preparations, concentrated foodstuffs, rubber solutions, and shoe creams. For certain commodities it is necessary, for technical reasons, to alter lengths, wall thicknesses, and weights; this is also necessary for products for which winding keys are used. The standard is not intended to cover such special requirements, but it is hoped that users of collapsible tubes will endeavour, as far as possible, to restrict their requirements to the range of sizes laid down in the standard.

The standardisation of collapsible tubes with other types of nozzle is being considered; if this proves practicable, the standard will be extended in due course.

Evolution of a Publishing House

(*Concluded from page* 448)

Research Station, rose to thank him on behalf of the guests for inviting them to a very pleasant ceremony, and for the generous hospitality he had dispensed.

Among the guests present were:

Mr. W. W. Weal (Editor, *World's Press News*), Dr. L. A. Jordan, C.B.E. (Director, Paint Research Station), Dr. W. Mitchell, Mr. Wilkes (Industrial Press), Mr. J. W. Field (Joseph Pyke), Mr. A. L. Bacharach (Glaxo) and Mrs. Bacharach, Mr. A. G. Porter (Pascall Engineering Co.), Dr. E. H. T. Hoblyn (Director, British Chemical Plant Manufacturers' Assn.), Mr. P. G. Luxton (Webbs Crystal Glass), Mr. Dalton (Practical Etching Service), Mr. E. F. Leak (E. F. Leak and Co.), Mr. C. Broughton Black (Pyrene), Mr. David Macaulay (David Macaulay Advertising), Major A. Graves (N.R.D.), Mr. H. H. Jowett (Technical and General Advertising Agency), Mr. G. Bradshaw (Purdy Machinery Co.), Mr. John Deeley (Public Relations Officer, Ford Motor Co.), Mr. Brian Reavell (Kestner Evaporator and Engineering Co.), Mr. W. P. Evans (May and Baker), Mr. J. F. Souhami (Stramit Boards), Mr. J. H. Etheridge (Cinema-Television), Mr. T. V. Prior (Murphy Chemical Co.), Miss Sylvia Weinberg (Armstrong-Warden), Mr. R. L. Cox (Taylor Bros. and Cox), Dr. Julius Grant (Director, Hehner and Cox), Mr. V. G Gardner (Benjamin Electric), Mr. K. G. Hibbs (Public Relations Dept., Courtalds), Mr. Gordon Long (Imperial Chemical Industries), Messrs. R. N. Roberts and P. D. Sherwood (Plant Protection), Mr. A. W. Smith (Frederick Aldridge), Mr. W. H. Wiles (H. H. Cale and Co.), Mr. R. Stennett-Wilson (J. Waidart and Co.), Mr. C. R. Woods (W. J. Bush and Co.), Mr. H. W. Lawrence (Raithby Lawrence and Co.), and Mr. H. W. Stonham (Raithby Lawrence and Co.).

SCRIBBANS-KEMP

The 26th annual general meeting of Scribbans-Kemp Limited was held on October 1 in London, Mr. H. Oliver-King (chairman and managing director) presiding.

The following is an extract from his circulated statement:

During the year just closed the total sales were the highest in the Group's history, but the margin of profit on all goods manufactured by our various companies narrowed considerably and the tendency is still towards finer margins, requiring a more highly specialised technique.

I am happy to be able to report that our export trade is up, particularly in regard to those two difficult dollar markets — Canada and the U.S.A. Concerning the Canadian company, your board has just authorised a substantial loan to that company to enable it, with the consent of the Bank of England, to purchase the control of David et Frère Ltée. This is an old-established biscuit company in Montreal, selling its wares throughout Canada, and your directors are satisfied that this acquisition will make a very useful addition to the Group, and be instrumental in returning dollars to this country.

In the retail businesses, the year has been spent in consolidation rather than expansion, though one new branch was opened and several more since the close of the accounts. Some twenty-two branches have been refitted and modernised, and it is becoming possible to recognise with some pleasure a Meesons's branch in many of our towns and cities. The sugar confectionery turnover throughout the retail shops is higher than ever, the profit is also higher than last year, but the margin of profit tends to decrease. Plans are afoot for the development of this business and we look forward to some considerable increase in sales.

The Barker and Dobson purchase is proving very satisfactory, and is showing excellent results. This is the well-renowned Liverpool company manufacturing sweets and chocolate, and their main difficulty is to meet the heavy demand made upon them for their products.

The profit is £1,556,062 as against £1,370,515 last year. This shows an increased profit of £185,547 before tax, a result which I feel sure the shareholders will regard as satisfactory, considering the uneven trading conditions and the uncertainty of the supply of raw materials. The total tax liability is not far short of a million on the profits earned to March 31, 1953.

The total revenue reserves now amount to £3,660,460, against £2,941,107 last year, and we have, in addition, capital reserves of £359,680, giving a total reserve figure of £4,020,140 as against £3,955,345 last year. The surplus of current assets over current liabilities stands at £3,234,671, an improvement of £496,226 over last year.

OBITER DICTA

● I would not be surprised if one day a chemist laid an egg. —*Sir William Ogg.*

● Please do not say we are being sacked; we are being faded.—*A Ministry of Food Official, speaking at Nottingham.*

● The white loaf is a Jezebel loaf, because it is good to look at, but bad to get fond of.—*Dr. H. Paul, Medical Officer of Health, Smethwick.*

● There will be a big demand for white bread to begin with, but the demand will fall when the public realises that it is flavourless in comparison with the National bread.—*Mr. P. D. Rhind, writing in the "Arkady Review."*

● I ventured to remark in a broadcast that I thought a little more red meat might help us; we have got it now, and perhaps it has helped us—at any rate, production is up, and we have won the Ashes.—*Lord Woolton.*

● To "be able to afford poultry" is indicative of a certain social grade; food snobbery is a thing which is hard to break down, though it certainly comes in for enough comment. —*Eve Ireland, writing in the "Irish Times."*

● For years the misguided public has persuaded itself that the more cream there is on the milk the better, but more and better separators would provide a means of getting rid of this unpleasant yellowish substance.—*Correspondent to the "Yorkshire Post."*

● Cooking French is often so bad as to be an insult to the language; even waiters do not always understand it, and plum pudding, the most traditional of English dishes, suffers under the title of "Pudding de Noel." — *Sir Alexander Maxwell, chairman of the British Travel and Holidays Association.*

● Take the Egg Board, throw in the Apple and Pear Board, beat them up with the Milk Board, slice in the Meat Board, add the Wheat and Barley Board, leaven up with the Department of Supply Board, then drown the blessed lot in the Water Board. — *Australian comment on decontrol, quoted by Col. M. W. Batchelor, at a recent Sales Conference.*

At the time of writing, sugar confectionery sales are well up, although flour confectionery sales do not show the same buoyancy as last year and we may be entering a keenly competitive period. However, the board has every confidence in the future of the business and its expansion.

The report was adopted and the total dividend of 12½ per cent. for the year was approved.

BOOKLETS RECEIVED

An illustrated booklet describing the works of the N.V. Chemische Fabriek "Naarden" has been published by the company.

■

A useful little booklet has been compiled by G. Street and Co. "for the benefit of those who have occasionally been mystified by technical terms used in advertisement production."

■

The main outlines of the present cocoa position are given in an illustrated booklet entitled "Cocoa—A Crop with a Future," which has been written by Paul Bareau and published by Cadbury's.

■

Latest publications issued by A.P.V. describe the welded fabrication of the corrosion-resistant metals, the standard range of stainless steel reaction vessels, and the Bowser beer filter.

■

Following their pre-war practice, George Cohen Sons and Co. are resuming publication of catalogues of their entire stock of new and second-hand plant and machinery, the first of which is now available.

■

A new catalogue describing their range of products has been issued by Quickfit and Quartz. Its object is to depict the range of Quickfit interchangeable laboratory glassware.

Where more than two components are involved, the assembly is provided with its own catalogue number to simplify ordering.

■

A booklet designed to enable users to make the best of their products has been issued by National Adhesives. It describes how to handle adhesives for transparent films, and contains a comprehensive chart of commonly-used films, showing manufacturers, trade names, gauges, types, and characteristics.

■

Suggestions for achieving the highest possible standards of hygiene in catering establishments are given in a Ministry of Food Booklet, "Clean Catering" (H.M.S.O., price 2s. 6d.).

The booklet has been prepared to meet a need for practical advice on this subject and is intended for those who wish to improve their existing premises as well as for those opening new businesses.

World Food News

Norway's Herring Meal Output

The annual output of Norway's herring meal is now between 150,000 and 180,000 tons, and of herring oil between 60,000 and 80,000 tons, the value of which is assessed at between £12,500,000 and £15,000,000. About 60 per cent. of the herring meal is exported, but most of the oil is retained in Norway for refining.

Baking and Canning in Hungary

Hungary has made an additional investment of £300,000 to improve the efficiency of the bakery industry and £275,000 to raise the quality of canned goods as part of the new Government policy to put better consumer goods on the market. The bakery investment is in addition to the £1,800,000 extra for Budapest announced in the spring.

One of the tasks of the food industry will be to enlarge the selection of part-prepared food for the housewife. More good quality jam is to be made, with higher sugar content, and the vitamin content of fruit juices is to be raised.

Food Exports from Northern Ireland

Although total exports from Northern Ireland in 1952 declined from £217,205,000 to £215,632,000, the value of exports of food and drink showed an increase of £8,539,000, the total figure being £41,182,000 (£32,643,000 in 1951). This is about one-fifth of all Northern Ireland's exports.

Eggs accounted for £9,695,000 (£9,523,000 in 1951), bacon, hams, and pork £8,195,000 (£3,726,000); milk condensed, dried, etc., £4,576,000 (£2,999,000); potatoes £3,464,000 (£2,582,000); poultry £1,985,000 (£2,211,000); and dried and preserved fruit £1,577,000 (£1,472,000).

Code Numbering Equipment

A new machine for marking code numbers and contents around cans and jars, which can be adapted to all types of labelling machine, has been devised by Rotary Imprinter, Inc., of Hillside, New Jersey. It is claimed that it will mark at the same production rate and as part of the labelling operation without the need for extra labour or separate handling.

It can be used to identify canned foods, chemicals, paints, and aerosol products as required by Government specifications, or to code cans and jars to identify date, batch, or place of manufacture.

A new style code and commodity wheel and a special black liquid ink have been developed for use with this machine.

Bilberries to Britain

The first two trial shipments of Norwegian bilberries, amounting to about one ton in all, were shipped to Britain recently. This is a good bilberry season in Norway and one association of bilberry pickers has been granted a licence to export 100 tons.

U.V. Light Spots Rot in Oranges

The use of a fluorescent type ultra-violet lamp to detect imperfect fruit in orange shipments is reported by the Glendora Citrus Association Plant, in California.

The lamp was installed in direct response to the need for a more exact inspection of a defective orange crop caused by an extremely wet growing season. While both rot and blisters in oranges are readily detectable under "white" light, it was difficult, as defect incidence increased, to accomplish a thorough inspection quickly enough as the fruit was conveyed along 36 inch wide inspection belts. As a consequence, rough booths were erected over a portion of the inspection lines and tubular long-wave ultra-violet lights were installed above the inspection belts.

Orange loads with heavy defect incidence were shunted through the booths in addition to the regular inspections. Under these lamps, both rot and blisters fluoresced to create a contrast more distinct than that produced under normal lighting. Inspectors were thus enabled to spot and remove all fruits, even those with very small defects, quickly and easily. Only fruit in excellent condition passed, and shipping schedules were maintained at normal rates. Success of the method has resulted not only in its use at this particular plant when needed, but also in the introduction of similar installation booths at 30 others.

Australian Meat Exports

That all Australian meat exports except to the United Kingdom and her armed forces overseas will be conducted on a trader-to-trader basis from October 1 was recently announced by the Commerce Minister, Mr. John McEwen. Mr. McEwen said that "the total quantity of meat available for shipment to dollar account and other open market destinations for 1953-54 has been agreed between Australian and U.K. Governments at 8,500 tons." The policy of trader-to-trader sales to dollar areas was departed from in the last few years because in 1950 there was an "extraordinarily wide price differential between North American meat values and Australian livestock values." The wide price differential no longer existed, and he gave an assurance that the new marketing arrangements would prevent the oversupply of profitable markets such as Canada.

Change of Name

The Canadian firm formerly known as Food Colours Ltd. is now known as Food Products Ltd., operating from 5353, St. Patrick Street, Montreal 20.

Code and contents markings made by new machine on sides of cans.

OVERSEAS ENQUIRIES

Wheat Flour

Wong Chew Onn and Co., Ltd., of 80-84, Princess Street, Kingston, Jamaica, are desirous of securing the representation of a United Kingdom mill producing wheat flour at keen prices.

The specification as required by the market is as follows:

Wheat Counter Flour maximum ·75 per cent. ash, protein content about 12 per cent.

Packing: 100 lb. net in strong export cotton bags.

Interested United Kingdom firms should communicate direct by air mail with the above company.

*

Flavouring Essences

Hindusthan Gas Co., Ltd., of 42, Garden Reach Road, Calcutta, India, are interested in representing United Kingdom manufacturers of flavouring essences. Representation would cover West Bengal, Bihar, Orissa, and Assam.

United Kingdom firms who are interested in this enquiry should communicate direct with the Calcutta firm.

*

Canned Sausages

Cecil B. Facey Ltd., 158-160, Harbour Street, Kingston, British West Indies, are anxious to be put in touch with United Kingdom manufacturers of canned Vienna sausages. The enquirers have stated that they feel there is a considerable amount of business to be obtained in 4 oz. cans, each containing about seven sausages. They say that a preference is shown there for sausages with straight ends as opposed to the type with tapered and sealed ends, which are usual in the United Kingdom.

United Kingdom manufacturers interested in this enquiry should write direct to the enquirers, forwarding full particulars.

*

Table Salt

Joseph Nadal and Company, Rue du Quai, Port-au-Prince, Haiti, are interested in contacting United Kingdom suppliers of table salt packed in one pound or one and a half pound boxes.

United Kingdom firms interested in this enquiry should communicate direct with the company, giving full particulars of their products, *i.e.* literature, c.i.f. prices in dollars, and an indication of earliest delivery dates.

*

Pork and Canned Meats

Bryan Brothers Packing Co. of West Point, Mississippi, have expressed interest in receiving quotations for canned beef, pork, and canned meats.

United Kingdom firms interested in this enquiry should communicate direct, by air mail, with Mr. J. H. Bryan, at the above address, giving quotations in U.S. dollars, c.i.f. New Orleans.

*

Liquorice and Toffees

The Gardner Importing Company, P.O. Box 14203, Houston, Texas, has expressed interest in contacting United Kingdom exporters of liquorice and toffees.

United Kingdom firms who are interested in this enquiry should write to the American concern direct, giving full details of their offer and quoting prices in dollars c.i.f. Gulf Port.

*

Agency Enquiry for Foodstuffs

Paul Reinhart Co., Inc., 66, Beaver Street, New York 4, are interested in contacting United Kingdom packers of foodstuffs with a view to representing them in the United States of America on an exclusive basis.

The company does not wish to be approached unless, after samples have been submitted and the question of quality and prices agreed upon, United Kingdom firms are prepared to enter into an absolutely exclusive representation agreement. Before this stage is reached, however, the United States firm are prepared to make a full market survey, without charge, to ascertain whether or not there are reasonable prospects of business.

The company states that any purchases made by them must be absolutely on the basis of material equal to samples submitted and approved and, where applicable, all purchases will be made on the basis of the seller guaranteeing the material to pass the United States Pure Food and Drug Administration's requirements.

One of a series of ornamented boxes designed by Raymond Loewy for the Swiss Colony cheese distributors of Chicago. The example illustrated is in the form of a game box.

United Kingdom firms interested in this enquiry should communicate with the United States firm's London associates, Reinhart and Co., Ltd., 20, Copthall Avenue, London, E.C.2 (Telephone MONarch 3321), giving full particulars of their products, *i.e.* literature and prices f.o.b. sterling.

*

Flour for Jamaica

Levy Bros., Ltd., of 44, Port Royal Street, Kingston, Jamaica, wish to secure the representation of a United Kingdom miller of flour.

United Kingdom manufacturers interested in this enquiry should communicate direct with the Kingston firm giving full particulars of their products, *i.e.* any literature, price lists, and an indication of earliest delivery dates.

*

Frozen Fruit

Mr. S. G. Bendon of the S. G. Bendon Utility Company, 857, Youville Square, Montreal, has expressed a desire to obtain the representation for Canada of United Kingdom growers and packers of frozen fruit.

Up to the present time this company has been acting on behalf of Dutch firms, but Mr. Bendon feels that, if it is possible to obtain supplies from United Kingdom sources, he would prefer to promote the sale of United Kingdom products.

Mr. Bendon is particularly interested in receiving quotations for frozen raspberries, strawberries, and if possible, frozen cherries. Such quotations should be made, giving c.i.f. Montreal prices to include a 5 per cent. brokerage commission for Bendon. The desired pack is in 30 lb. pails, although in barrels would be considered. The required quality is either 2 or 3 plus 1. It is understood that this refers to the amount of sugar incorporated in the pack.

The latest price quotations received from Dutch growers and packers are said to be as follows:

For frozen raspberries, 17 cents per lb. c.i.f. Montreal.

For frozen strawberries, 18½ cents per lb. c.i.f. Montreal.

The Trade Commissioner reports that there would appear to be very good prospects for the sale of frozen fruits in Eastern Canada this season as the local strawberry crop was only about 20 per cent. of normal production and jam manufacturers and other users will have to import frozen or fruit packed in sulphur dioxide to augment local supplies.

Interested United Kingdom growers and/or packers, but not United Kingdom fruit brokers, should write direct, by air mail, to Mr. S. G. Bendon giving details of their products, delivery dates, c.i.f. prices, Montreal, as indicated above.

All foodstuffs destined for the United States are subject to the United States Food and Drugs Administration Regulations.

News from the Ministries

Appointments

Mr. B. A. Cash-Reed, Food Attaché in Washington, is now Attaché for Food and Agriculture.

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Mr. Neil Frank McCann, B.Sc., N.D.A., has taken up his duties as Agricultural Adviser (Technical) in the U.S.A. He is attached to the United Kingdom Scientific Mission in Washington. His address is Bradford Building, 1800 K. St., N.W., Washington D.C.

More Oils and Fats

Larger supplies of oils and fats are now available to certain food manufacturers. This has been made possible partly because some traders and manufacturers are not taking up their full entitlement of oils and fats, and partly because of the increase in the Ministry's raw material stocks resulting from improved shipments from countries in the sterling area, particularly West Africa.

The rate of allocation of oils and fats to the flour confectionery industry and to the chocolate and sugar confectionery industry has been increased to 60 per cent. as from September 6, 1953.

A further quantity of palm kernel oil that has not been taken up from allocations to trade users is to be reallocated to the biscuit industry and the chocolate and sugar confectionery industry.

Marketing of Home-grown Wheat

As a result of the decontrol of cereals there will be a free market in home-grown wheat this season and this grain can now be sold to any buyer and for any purpose. After the decontrol of the flour milling industry on August 29, 1953, prescribed usage of home-grown wheat in millers' grists ceased. In the national interest, however, the flour milling industry has agreed with the Ministry of Food that if normal marketing arrangements do not provide a sufficient offtake from the 1953 home-grown wheat crop at not less than the prices guaranteed to growers under the Agriculture Act, 1947, millers will use their best endeavour to take up home-grown wheat which is offered subject to a maximum of 1,250,000 tons during the current cereal year.

The aim will be to take up to 500,000 tons of this quantity off farms during the harvest period. This will be effected under special arrangements agreed with the milling industry whereby millers will continue through normal channels to purchase home-grown wheat from merchants or growers either on their own account or for storage on behalf of the Ministry of Food at not less than the guaranteed prices to growers. Where wheat is purchased for storage under these arrangements, the price at which millers subsequently appropriate it for usage in their grists will be settled weekly, in advance, under arrangements agreed between the industry and the Ministry.

Export Trade in Sugar

British sugar refiners will, from January 1, 1954, take over the remaining responsibilities of the Ministry of Food for conducting the United Kingdom's export trade in refined sugar and syrup.

This decision extends the arrangements made in October, 1952, and January, 1953, under which British sugar refiners resumed responsibility for the trade in refined sugar and syrup to a limited number of markets.

Danish Butter Agreement

Representatives of the Danish Butter Export Committee, the Danish Dairy Association, and the Ministry of Food met in London on September 2 to discuss the question of prices under their long term agreement for the export of Danish butter to the United Kingdom from the forthcoming production season commencing on October 1, 1953, and ending on September 30, 1954.

It was agreed that the current price of 387s. 6d. per cwt. f.o.b. should be increased by 7s. 6d. to 345s. per cwt. f.o.b. and that all other terms and conditions of the long term agreement remain unchanged.

Salvaged Unrationed Foods

Restrictions on the disposal of salvaged unrationed foods were removed on September 27, 1953. Holders of such foods are now free to sell them to whom they please subject only to any maximum price Order or to any regulations relating to the quality of food that is sold for human consumption.

With the revocation of the Salvaged Goods Order, the disposal of salvaged rationed foods will be controlled by authorities issued under the Rationing (General Provisions) Order.

All holders of salvaged rationed foods in quantities of 28 lb. or more must continue to offer them either to the Ministry's Area Commodity Officers or to a wholesaler who deals in sound goods of the same kind. Where the quantity is less than 28 lb. the holder will be free to dispose of it either to a wholesaler nominated by him or to a hospital or industrial canteen direct instead of to a salvage dealer.

Holders and wholesalers of salvaged rationed foods should apply to Regional or District Food Officers for the necessary authorities to dispose of such foods.

Sugar Rationing Ends

All statutory controls over the distribution, use, and prices of sugar, syrup, and treacle have now been abolished; price control of invert sugar has also been discontinued. All restrictions on the use of sugar for manufactured foods, such as cakes, biscuits, and sweets, has also ceased.

Ample supplies of sugar are available and retail prices are expected to remain much the same as at present.

The Ministry of Food will continue to be the sole importer of sugar for consumption in this country until it has been decided how the undertakings given under the Commonwealth Sugar Agreement of 1951 can be carried out in the future.

By agreement with the refiners, the price of standard granulated sugar in two cwt. bags is to be controlled at the point of delivery from the refiners' premises. From that point onwards all sugar sold by wholesalers and retailers is free of control.

Australian Meat Prices

Agreement has been reached with the Australian Meat Board on the prices to be paid for beef and veal in the year beginning October 1, 1953, the second year of the 15 year meat agreement which was signed in October, 1951. Under the terms of this agreement, which links price changes with variations in the cost of production, a general increase of 5½ per cent. in the prices of beef and veal has been agreed. There will, however, be a penalty of 1d. per lb. on heavyweight carcasses of beef, beginning on January 1, 1954.

To stimulate the production and shipments of higher quality younger beef a new grade of frozen beef has been introduced which will receive a premium of 1·6d. (one point six pence) per lb. over other first quality beef.

For the year beginning October 1, 1953, the weight range schedule for pig meat already in force for New Zealand has been adopted for Australia also, to give price preference to the lighter pigs and penalise heavy carcasses. The general level of prices will be similar to that of the schedule which has operated in 1952-53. Individual prices are the same as those agreed with New Zealand.

Information and Advice

This Service is available to subscribers to FOOD MANUFACTURE. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Sorghum Syrup

B.6770. *We understand that sorghum syrup can be used in the production of fortified confectionery. What is sorghum syrup and how is it used for this purpose?* (Devon)

Sorghum syrup is obtained from a sugar-producing grass resembling maize in appearance. It has a characteristic flavour, and confectionery in which it is used would partake of that flavour. The invert sugar content of the syrup is sufficiently high to allow replacement of the whole or part of the constituent inverts in any standard formula.

The following formula for the production of fortified aerated hard sugar goods, using sorghum syrup, is given as a basis for trial:

Granulated sugar	28 lb.
Sorghum syrup	10 ,,
Vegetable butter	8 oz.
Dried brewers' yeast	2 lb.
Salt	2 ,,
Water	5 pints

The sugar, sorghum syrup, and water are placed in the open pan of a vacuum cooker, and when the sugar is thoroughly dissolved, the batch is cooked to 265°F. The vegetable butter is added to the batch, which is pumped to the vacuum pan, where it is held at 28 inches of vacuum for five minutes.

The dried brewers' yeast is worked into the cooling batch on the slab before pulling. A clear casing may be placed around the aerated portion if required. The batch is then run through a die machine and wrapped.

Brawn Manufacture

B.6771. *I wish to make a good brawn and should be glad of your assistance.* (Beds.)

Pork head meat, ox cheek, and beef trimmings can all be utilised in the manufacture of brawn. If they have not already been salted, it is better to immerse them in a 60° brine for from three to five days, and a special brine should be made and kept for this particular purpose.

The meat to be used should be scalded in boiling water and then placed in several changes of cold water, until the latter is quite clear. All bones should be carefully removed and the meat placed in the copper with a small quantity of water—sufficient to cover it will be found ample—and rapidly brought to the boil. The object of this is to seal the outer covering of the flesh and prevent the fat from boiling out. This in turn helps to reduce losses. The temperature is reduced to about 200°F. and the meat is allowed to simmer until tender. The time will depend on the meat being used; ox cheek, for example, will require a longer simmering time than pork pieces.

When tender, the meat is removed from the copper, the rinds are put through the mincer, and the rest of the meat through a brawn dicing machine. The stock is skimmed off and carefully strained, the quantity required for the brawn being replaced in the copper, together with the meat, and brought once again to the boil. It may be necessary to strain again at this point. No salt need be added owing to the brining of the meats, but it is customary to incorporate a proportion of seasoning to assist the flavour.

The following is a good stock seasoning:

	Parts
Ground white pepper	64
Ground mace	2
Ground ginger	1½
Ground nutmeg	½
Oil of lemon	

The brawn is filled into suitable containers and allowed to cool. In the summer months it will be necessary to put in some gelatine to help the jelly to set. Approximately 3 oz. to each 20 lb. of brawn is sufficient.

Information Supplied

This Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.6686. *Electrically operated can opener.* (N. Ireland)
B.6687. *Meat cure.* (Lancs.)
B.6688. *Decorticated sunflower seeds.* (Middx.)
B.6690. *Fruit cake, fudge, and icing sugar.* (India)
B.6691. *Potato crisps.* (London)
B.6693. *Tins, cartons, and jam tops.* (India)
B.6694. *Trade mark registration.* (Devon)
B.6697. *Cooling tunnels for chocolate and cocoa products.* (Surrey)
B.6698. *Powdered pectin.* (Kent)
B.6699. *Income tax.* (London)
B.6700. *Biscuits.* (Ches.)
B.6702. *Potato crisps.* (S. Rhodesia)
B.6703. *Lemon barley water.* (Scotland)
B.6708. *Soya flour.* (Belgium)
B.6709. *Travelling ovens.* (London)
B.6710. *Dicing machinery.* (London)
B.6711. *Vegetables in brine.* (Glam.)
B.6713. *Electric labelling machine.* (S. Africa)
B.6714. *Bacon smoking.* (Staffs.)
B.6715. *Preservatives in meat products.* (Dorset)
B.6716. *Diabetic jam.* (Lancs.)
B.6717. *Chewing gum and bubble gum.* (London)
B.6719. *Moulds for dripping.* (Yorks.)
B.6720. *Bottling of cockles.* (London)
B.6722. *Cold mix ice cream powder.* (Lancs.)
B.6724. *Emulsion for coating paper.* (London)
B.6726. *Ultra-violet radiation.* (Hants.)
B.6727. *Thermocouple for temperature measurement.* (Denmark)
B.6729. *Bacon branding.* (Wilts.)
B.6731. *Grinding egg shells.* (Devon)
B.6732. *Bacon and ham curing.* (S. Africa)
B.6733. *Shortcake biscuits.* (London)
B.6734. *Self-sterilising paint.* (London)
B.6736. *Ham presses.* (Yorks.)
B.6737. *Potted meat paste.* (Yorks.)
B.6738. *Smoked salmon.* (Yorks.)
B.6739. *French fried potatoes and meat extract.* (Germany)
B.6742. *Second-hand marmalade cutters and cubers.* (Jerusalem)
B.6746. *Carton making and gluing.* (Ireland)

Information Required

B.6744. *Manufacturers of a vacuum extraction plant for the removal of crab meat from the shell prior to processing.* (Devon)

Recent Patents

695,329. ANDERSON, R. F.: Confection mould filling machine.
695,506. AKTIEBOLAGET SEPARATOR: Method and arrangement to regulate the fat content in cream when separating milk or cream continuously.
695,577. SOC. ANON. E. GEISER: Packing cases for the transport of fruit.
695,635. HOBART MANUFACTURING CO.: Weighing scales.
696,864. AMERICAN VISCOSE CORPORATION: Apparatus for making stuffed products, for example, sausages.
696,983. DELAROUZEE, G. A., and CHEVAUCHEZ, J.-L.: Conditioning, drying, and sterilising process applicable to cereals.
696,986. STERLING DRUG, INC.: Stabilised papain composition and its preparation.
697,071. SOLLICH, R.: Flexible moulds for casting settable or hardenable plastic substances, for example, jellies, sugar masses, or fondant centres.
697,094. HIGHBRIDGE BACON CO., LTD.: Mills for curdlike substances, such as cheese curd.
697,223. WILKINSON HIGH FREQUENCY, LTD.: Process and apparatus for treating mineral or vegetable oils for the production of oils of lower boiling point.
697,301. SUDDEUTSCHE ZUCKER-AKT.-GES.: Process for the production of sugar.
697,354. SIMON, LTD., H.: Measuring device for checking the efficiency of cereal product, or like mills, in which the materials for processing are carried by pneumatic elevators.
697,516. PILLSBURY MILLS, INC.: Insecticidal composition with a wheat dust carrier.
698,116. BATGER AND CO., LTD.: Device for dispensing small articles, particularly sweetmeats.
698,147. GOWER, A. C.: Mould for making water ice confectionery.
698,343. MCRAE, J.: Device for use in forming skinless sausages.
698,433. ROSE BROS. (GAINSBOROUGH), LTD.: Formation of wrapped ice cream sandwiches and apparatus therefor.
698,502. CANDY FILTER CO., LTD., MERCER, D., and AITKEN, R. W.: Testing of water for chlorine.

ABSTRACTS OF BRITISH PATENTS

Treatment of Fish Livers

It has been found that if finely crushed fish livers are heated to between 45°C. and 70°C. and treated with a small amount of alkali to adjust the *p*H of the mass to between 7·5 and less than 8·5, a high percentage of the major components may be recovered. The process is applicable to the livers of cod fish, halibut, dogfish, tuna fish, etc. The highest percentage of oil is found in dogfish liver and amounts to about 70 per cent. of the weight of the liver. Cod fish livers contain from 40 to 65 per cent. oil, and halibut and tuna fish livers possess less than 20 per cent. oil.

In the above described process, the liver is macerated, heated, then treated with an alkali, cooled to separate the oil and protein-water and then centrifuged. The liver may be macerated and then treated with an alkali before it is heated above 45°C. In such process when heating from below 45°C. separation of oil from protein-water occurs whenever the critical temperature is reached. This second procedure is not as efficient as that first mentioned since the percentage of oil separated is not as great, owing to inability of the alkali to distribute and react readily at low temperatures.

In the treatment of livers low in oil there may be added a vegetable or fish liver oil, to the material after or before alkali and heat treatment. Separation may then be completed. An example would be the addition of cod liver oil or vegetable oil to halibut liver.

692,101. *Canadian Patents and Development Ltd.*

Stabilised Peanut Butter

A method is given of obtaining an improved stabilised peanut butter containing a multiplicity of intracongealed disassociated fat units which do not intercongeal or freeze together to relative continuity at temperatures below the congealing point of such disassociated fat units.

The peanut butter is additionally characterised by its softness at temperatures below the congealing point of each of a multiplicity of intraconfluent but disassociated fat units, thereby affording increased spreadability of the product.

It can be produced by conventional equipment normally used in the manufacture of stabilised peanut butter generally, plus special equipment to achieve the deliberately disassociated intracongealed fat units of the butter at a temperature below their congealing points wherein the fat units remain relatively non-confluent or remain separated.

695,140. *Rosefield Packing Company.*

Foodstuff in Batter

A continuous process has been devised for cooking pieces of foodstuff in batter which comprises the steps of completely enveloping each piece of foodstuff in batter, setting the batter envelope by submerging the enveloped pieces in succession in a stream of hot oil so as to avoid contact with each other and with the walls of the conduit confining the stream, transferring the pieces by means of the stream away from the point at which they enter the stream and cooking the pieces of foodstuff and batter by moving them in succession through hot oil while keeping them completely submerged in it.

The batter may be set by dropping the pieces of foodstuff into a horizontal stream of oil, the depth of the stream and the height from which the pieces are dropped being such that, though submerged, they never sink to the bottom of the stream.

After the batter has set, the movement of the pieces away from the point at which they enter the stream may be assisted mechanically, for example by forwarding members attached to an endless conveyor. The movement of the pieces during cooking is brought about by forwarding members attached to a second conveyor.

During cooking the pieces of foodstuff may be kept submerged in the oil by one flight of a belt of the second conveyor carrying the forwarding members by causing this flight of the belt to move underneath the surface of the oil.

Preferably cooking takes place in a stream of oil and the stream of oil in which setting takes place may be the same stream as that in which cooking takes place, the stream being located within a single container. This container may be provided with a deep end into which the pieces of foodstuff are dropped. The present invention also provides apparatus for cooking pieces of foodstuff in batter in succession.

694,947. *Smethurst Grimsby Ltd., Margaret Christine Swallow, Joseph Byron Ward, and Francis William Ward.*

Vitamin Coated Table Salt

A feature of a recent invention resides in the manner in which the vitamins are applied to the granules of salt. The vitamins are ground to a powder which is fine relative to the particle size of the salt. By intermixing the vitamins and the salt, the vitamins appear to adhere to the surface of the salt granules, thus forming a coating thereupon. This feature is of extreme importance as if the powder did not coat the salt particles it would be necessary to grind the salt particles to the same size as the vitamin particles to prevent separation between them. If a powdered material is added to the salt granules, and the mixture agitated, the powder particles will tend to separate from the salt particles and collect at the bottom of the container. However, the vitamins in finely divided form have a tendency to cling to the salt particles and to coat the same, thereby ensuring proper mixture between the vitamins and the table salt and preventing separation between these elements.

694,597. *Merton Adison Searle and Roy Melisander Johnson.*

ABSTRACTS OF GERMAN PATENTS

Fruit Sorting

Sorting machine for fruit, especially apples and the like, wherein several endless conveyor bands are used running in opposite directions beneath an inclined sorting apartment transverse thereto with sorting chutes separated from each other by dividing walls.

850,676. *Alfred Lohden.*

Baking Arrangement

The device consists of a hood closed at the rear end and open at the front, with a cover for the front end and a base plate. The closure plate for the front end is provided with holes for the passage of air and for observation of the contents being baked. These holes are preferably of a wide based conical form. The closure plate is provided with a withdrawal handle.

850,513. *Maria Borngahser.*

Electric Cooker

Electric cooking, roasting, and baking apparatus is provided with double walls. The space between the double side walls is filled with insulating material and the space between the base walls is filled with solid electric heating material.

850,065. *Karl Bertram.*

British patents and trade marks have been selected from the "Official Journal of Patents" and the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

Trade Marks

PELKMAN.—702,651. Machines for sifting and blending flour, for kneading, dividing, and moulding dough, for moulding bread, for rolling pastry, for depositing dough in baking tins and for moulding rolls and buns; machines for slicing and wrapping bread; machines for making biscuits; conveyors (machines) and travelling tables (in the nature of conveyors); mixing machines and whisking machines; apparatus for tipping dough bowls and chutes for delivering dough, all being parts of bakery machinery; all the aforesaid being goods used in the bakery trade; and machines for reshaping biscuit tins and machines for cleaning empty flour sacks. **Pelkman Bros., Limited,** 1, Brixton Road, London, S.W.9; Manufacturers.

QUEEN'S SHORTIES.—705,515. Biscuits (other than biscuits for animals). **McVitie and Price, Limited,** The St. Andrew Biscuit Works, Robertson Avenue, Edinburgh, 11, Scotland; Manufacturers.

HILLHALL.—705,598. Jams, marmalade, mincemeat, lemon curd, orange curd, banana curd, canned fruit, canned vegetables, canned fish, canned meat, canned soups, apple purée; meat paste, fish paste, canned poultry, jellies (for food), canned milk puddings, meat roll, galantines, meat loaf, salad cream; and canned meat and vegetables, being ready cooked meals. **Gracey Brothers, Limited,** 96, Great George's Street, Belfast, Northern Ireland; Manufacturers and Merchants.

SUNDA.—714,510. Preparations made principally of sugar for use in spreading on foodstuffs. **Sunda, Limited,** Finsbury House, Blomfield Street, London Wall, London, E.C.2; Manufacturers.

DON CAMILLO.—715,847. Fresh meat, salt meat and preserved meat; fish and poultry (other than live fish and poultry); milk, dairy products (for food), edible oils, edible fats, and tomato juice. **Piero Natali,** Corso Como 9, Milan, Italy; Manufacturer and Merchant.

FRUIT - HEART.—715,957. Fruit - flavoured preparations in slab, crystal or powdered form, for use in making jellies and junket. **Monkhouse and Glasscock, Limited,** 5, Hardwidge Street, Snowsfields, London, S.E.1; Manufacturers and Merchants.

THERMOCYCLON.—716,301. Pneumatic drying installations for grain and the like agricultural produce. **Scottish Mechanical Light Industries, Limited,** Scotmec Works, 42-44, Waggon Road, Ayr, Scotland; Manufacturers and Merchants.

CLARMORE. — 716,525. Confectionery (not medicated). **Clarnico, Limited,** Clarnico Confectionery Works, Wallis Road, Victoria Park, London, E.9; Manufacturers.

SUNNY HILLS.—716,626. Processed cheese and cheese spread. **Adams (Wholesale) Dairies, Limited,** Buxton Road, Leek, Staffordshire; Manufacturers and Merchants.

HIGHLAND GLEN.—717,128. Biscuits for human consumption, but not including cheese biscuits. **Excelsior Biscuit Company, Limited,** 11, Old Jewry, London, E.C.2; Manufacturers and Merchants.

WILKO.—717,201. Non-medicated confectionery. **W. R. Wilkinson and Company, Limited,** Ferrybridge Road, Monkhill, Pontefract, County of York; Manufacturers.

CASALITZA. — 717,239. Dried fruits. **H. J. Hooker, Limited,** 24-25, Fenchurch Street, London, E.C.3; Merchants.

EASTERN STAR. — 717,404. Ground pepper. **Lewis, Tilbury and Company, Limited,** 41, Eastcheap, London, E.C.3; Manufacturers and Merchants.

SLIMLINE. — 717,633. Non - alcoholic drinks and preparations for making such drinks. **The Apollinaris Company, Limited,** Sardinia House, 52, Lincoln's Inn Fields, Kingsway, London, W.C.2; Manufacturers.

WHITE CLOUD.—718,044. Flour. **Kirby's (Selby), Limited,** Imperial Flour Mills, Barlby Road, Selby, Yorkshire; Millers.

GLOBETROTTER.—718,395. Non-medicated confectionery and chocolate. **Hawkes Brothers, Limited,** 40, New Street, Chelmsford, Essex; Manufacturers.

RICORY.—718,857. Coffee, coffee and chicory mixtures, coffee essences and extracts, chicory and chicory mixtures. **The Nestlé Company, Limited,** Hayes, Middlesex; Manufacturers.

FLOWER GIRL.—718,913. Chocolate and non-medicated confectionery. **Quality Foods, Limited,** 179-181, Park Avenue, London, N.W.10; Manufacturers.

SPIRAL.—719,068. Baking powder. **The British Arkady Company, Limited,** Skerton Road, Old Trafford, Manchester, 16; Manufacturers.

New Companies

Charles Gardiner (Couvertures), Limited. (522461.) 56, Bermondsey Street, London, S.E.1. To undertake the making and covering of biscuits and sugar confectionery for the trade, and to manufacture and deal in chocolates, sweets, etc. Nom. cap.: £100 in £1 shares. Dirs.: F. W. Howse, 5, Barton Road, London, W.14, and H. Birmingham, 19, Wallenger Avenue, Gidea Park, Romford.

Viskase, Limited. (522553.) Woldham Road, Bromley, Kent. To acquire, manufacture, prepare for market, import, export, and deal in casings and tubing used as food or sausage casings, etc. Nom. cap.: £100,000 in £1 shares (50,000 "A" and 50,000 "B"). G. A. Fletcher, 6, Woodside Road, Bromley, Kent, signs as director.

Paxo (Great Britain), Limited. (522551.) To carry on business of manufacturers, sellers, importers, exporters, and growers of spices, herbs, and consumable articles and produce; chemists, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: to be appointed by subs. Subs.: W. A. Innes, Chapel Green House, Earlsferry, Elie, Fife (co. dir.), and W. Tricker, Brookfield, The Common, Uxbridge (co. dir.).

Sunny Crop Tea Company, Limited. (522569.) 48, Mark Lane, London, E.C.3. To carry on business of manufacturers of and dealers in tea, coffee, cocoa, or other food beverages and preparations, etc. Nom. cap.: £200 in £1 shares. Dirs.: Ivy N. Glover, 48, Upsdell Avenue, Palmers Green, London, N.13 (clk.); A. S. McDonald, R. L. Garnett, and A. C. Barnard, addresses not stated.

Peelless Paks, Limited. (522579.) 57, Bayham Place, London, N.W.1. To carry on business of manufacturers, importers and exporters of and dealers in foods, drinks, sweets, confectionery, grains, cereals, fruits, and vegetables, etc. Nom. cap.: £100 in £1 shares. Dirs.: E. G. Gibbons and Mrs. L. M. Gibbons, both of 15, Thornton Way, London, N.W.11.

Far East Agencies, Limited. (622694.) To carry on business of buyers, sellers, importers and exporters of and manufacturers of and dealers in spices, curry, fish, food, groceries, etc. Dirs.: Abdul Moonan, 29, St. Mary Abbott's Terrace, Kensington, London, W.14, and J. Waters, 12, Gunnersbury Lane, Acton, London, W.8.

S.C. (Foodstuffs), Limited. (522709.) 22-23, Laurence Pountney Lane, Cannon Street, London, E.C.4. To carry on the business of manufacturers and dealers in and agents for food and foodstuffs, etc. Nom. cap.: £5,000 in £1 shares. Dir.: R. H. Marlow, Flat 4, 16, Mary's Hill Road, Shortlands, Kent.

Wrington Vale Dairies, Limited. (522799.) To take over business of a wholesale dairyman and manufacturer of milk products carried on at 279, North Street, Bedminster, and Smyth Road, Ashton Gate, Bristol, by John R. Cox. Nom. cap.: £20,000 in £1 shares. Dirs.: J. R. Cox (permt. gov. dir.), and Mrs. L. A. Cox, 15, Cotham Lawn Road, Bristol, 6, and E. C. J. Heal, 549, Bath Road, Saltford, Somerset.

Shirland Confectionery Company, Limited. (522808.) 386, Harrow Road, London, W.9. Nom. cap.: £100 in £1 shares. Dirs.: H. J. Specter, 5, Arthur Court, Queensway, London, W.2; M. L. Specter, 9, Harrington Court, London, S.W.7, and S. S. Specter, 249, Clifton Drive South, St. Annes-on-Sea.

Knee and Crowe (Refrigeration), Limited. (522849.) Bank Buildings, 325, Bloomsbury Street, Nechells Green, Birmingham. To carry on business of manufacturers of and dealers in refrigerators, milk coolers, sterilisers, etc. Nom. cap.: £1,500 in £1 shares. Dirs.: L. G. Knee, 193, Valley Road, Sheldon, and C. L. Crowe, 51, Goodrick Street, Birmingham, 7.

W. A. Turner, Limited. (523009.) The Garden Factory, Stowmarket, Suffolk. To take over business of sausage manufacturers carried on as "W. A. Turner" at Stowmarket, Suffolk. Nom. cap.: £30,000 in £1 shares. Dirs.: A. F. Turner (gov. dir.), and Mrs. E. M. Turner, Highlands, Needham Market, Suffolk.

F.B. Food Products and Company, Limited. (523026.) 16-18, Clapham Junction Approach, London, S.W.11. Nom. cap.: £1,000 in 900 ordinary shares of £1 and 2,000 ordinary shares of 1s. each. Dirs.: W. J. R. Banks, 61a, Albert Bridge Road, Battersea, London, S.W.11, and G. T. Fletcher, 69, Arlington Lodge, Brixton Hill, London, S.W.2.

B.M.C. Confectionery Productions, Limited. (523096.) 59, Sloane Street, London, S.W.1. Nom. cap.: £2,000 in £1 shares. Dirs.: S. H. Blundell, 45, Droop Street, London, W.10; F. E. Mostyn, 25, Margaretta Terrace, Chelsea, London, S.W.3, and A. J. Collier, 12, Gainsborough Court, Nether Street, London, N.12.

R.H. Laboratories, Limited. (523228.) Coronation House, Cogmore Lane, Chertsey, Surrey. To carry on business of manufacturers of and dealers in strip, chewing, bubble, and other gums; sweets, chocolates, and confectionery, biscuits, patent foods, medicines, etc. Nom. cap.: £2,500 in £1 shares. Dirs.: C. Trethewey, Lorne Park, Thameside, Laleham, Middlesex (permt.); I. E. Revell, 108, Wood End Lane, Northolt, Middlesex, and J. G. Haslen, 7, Torver Road, Harrow, Middlesex.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.